FOOD ENGINEERING

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

October 1952

35 CENTS

PACKAGE INNOVATION, frozen concentrate in 2½-oz. bags, opens new market for Fanco. Here bags leave freezer. (P. 74)

In This Issue:

VACUUM COOLING . . . 104
Bulk Sugar Service . . 71
Batter Mixing Tripled . 73
Frozen Juice in Bags . 74
Jam—British Way . . 76
Coating Ice Cream . . 79
Plant Squeeze Licked 82
Latest Instruments . 87
Painless Hog Killing . 90
Safety After 5 P.M. . 93
Candy Keeps Longer 95
Better Pea Grading . 99
MM's Zero Storage . 100
Truck for Bulk Flour . 103
Unclouding Wines . . 112
Choosing Pie Apples 114
Brewer's Safety Tip . 116
Bulk Sugar Foldout . 136
Newest Oil Process . 143
"Dial 80 for Facts" . 147

Use the Free
READER SERVICE

. . . for help on your job. It brings needed data on equipment, supplies—also useful catalogs

Card Inside Back Cover

TROUBLE FREE FOR 15 YEARS handling muriatic acid!

Another 'open and closed' case for

GRINNELL-SAUNDERS DIAPHRAGM VALVES

In 1936, a Canadian mine installed Saunders Diaphragm Valves with rubber linings on the feed and drain piping of an underground tank used for the storage of muriatic acid. Today, after 15 years, those *same* valves are in use—having required no maintenance except for periodic replacement of diaphragms, a simple operation done without removing the valve from the line.

Grinnell-Saunders Diaphragm Valves are available in many different combinations. Bodies are made in a variety of metals —iron, stainless steel, bronze, aluminum and others. ***But of more importance*** is the fact that a body of cast iron (a metal not in short supply) can be lined with glass, lead, natural rubber, neoprene and other materials which, in many instances, handle corrosive fluids ***better*** than metals.

Diaphragms come in natural rubber, neoprene, butyl, hycar, a special synthetic for foods and KEL-F. This last is chemically inert to all acids and alkalies in all concentrations with the exception of molten alkali metals.

From this broad selection of materials, the problems which the Grinnell-Saunders valve can solve are extremely varied. No wonder industry after industry is putting it on the line.

OPEN
No packing glands to demand attention. Working parts isolated from fluid... sticking, clogging, contamination, corrosion eliminated.
CLOSED
Compressor or finger plate supports the diaphragm in all positions. No metal-to-metal seats to become damaged or wire-drawn.

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

Food Engineering

Vol. 24 • OCTOBER, 1952 • No. 10

PUBLISHER *Edwin D. Fowle*
EDITOR *Frank K. Lawler*
ASSOCIATE EDITOR *A. V. Gemmill*
ASSOCIATE EDITOR *C. R. Havighorst, San Francisco*
MANAGING EDITOR *Herb Powell*
ASSISTANT EDITOR *John V. Ziemba*
ASSISTANT EDITOR *F. W. McCarthy*
ASSISTANT EDITOR *Lloyd E. Slater, Chicago*
ASSISTANT EDITOR *Ivan C. Miller*
ART EDITOR *Priscilla A. Truax*
EDITORIAL ASSISTANT *Paul F. Mundt*
CONSULTING EDITORS *S. D. Kirkpatrick, R. S. McBride*
WASHINGTON *G. B. Bryant, Jr.*
WORLD NEWS *R. F. Anderson*
ECONOMICS DEPARTMENT *Dexter M. Keezer*
SALES MANAGER *G. E. Riddell*

• • •

FOOD ENGINEERING
(Formerly Food Industries)
October, 1952 Vol. 24, No. 10
Member ABC and ABP

Published Monthly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office 99-129 N. Broadway, Albany 1, N. Y.**

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President & Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Div.; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President & Director of Advertising; J. E. Blackburn, Jr., Vice-President & Director of Circulation.

Subscriptions: Address correspondence to Food Engineering—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.

Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants. Position and company connection must be indicated on subscription orders.

Single copies 35c. Subscription rates—U. S. and possessions $2 for 1 yr., $3 for 2 yr., $4 for 3 yr. Canada, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Other Western Hemisphere countries $10 for 1 yr., $16 for 2 yr., $20 for 3 yr. All other countries, $15 for 1 yr., $25 for 2 yr., $30 for 3 yr. Entered as 2nd class matter Aug. 26, 1948, at Post Office at Albany, N. Y. under Act of Mar. 3, 1879. Printed in U.S.A.

Copyright 1952 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

FEATURE ARTICLES

		Baking	Beverages	Cereals	Confectionery	Dairy	Fruits, Vegetables	Meats, Fish	Other Foods
Now—Local Sugar Processing	71	•	•	•	•	•	•	•	•
Continuous Mixer Triples Output	73	•							
Advances Flexible-Film Packaging With Frozen Concentrate in Bags	71		•			•	•		•
When It Comes To Making Jams, British Are Different	76	•					•		
Speeds Coated Ice Cream Bars	79				•	•			
How 1-Building Efficiency Cured Old 5-Building Squeeze	82	•	•	•	•	•	•	•	•
New Process Instruments	87	•	•	•	•	•	•	•	•
Hormel Perfects Painless Kill	90							•	
Safety After 5 O'Clock	93	•	•	•	•	•	•	•	•
Extending Candy Shelf-Life	95				•				
Shaker Improves Size Grading	99						•		
Construction Innovations Provide Zero-Storage Economies	100					•	•	•	
New Bulk Flour Truck Aids Miller, Baker	103	•		•					
Vacuum Cooling Saves Costly Process Time (Report)	104	•	•	•	•	•	•	•	•
New Clarifier Removes Metals From Wines	112		•				•		•
Selecting and Processing Apples for Quality Pies, I	114	•					•		
How To Remove Hazard From Safety Controls	116	•	•	•	•	•	•	•	•
New "Sugar Service" Processing Line (Flowsheet)	136	•	•	•	•	•	•	•	•
Simple, Direct Extraction of Coconut Oil	143								•
Supervisors Just Dial "80"—And Get All the Facts	147	•	•	•	•	•	•	•	•

NEW EQUIPMENT AND SUPPLIES

Speed Changes Made Quickly, Easily With New Drive	117	•	•	•	•	•	•	•	•
Wrappers Imprinted by Automatic Unit	117	•	•	•	•	•	•	•	•
Fractional-Hp. Vari-Speed Motors Employ 110 or 220v	118	•	•	•	•	•	•	•	•
Porcelain Equipment Has Glass-Fiber Plastic Armor	118			•					•
Industrial Fan Handles Air, Granular Materials	118	•	•	•	•	•	•	•	•
Compact Hoist Saves Mechanic's Time	119	•	•	•	•	•	•	•	•
Beam-Type Rail Protects "Bump-Spots"	119	•	•	•	•	•	•	•	•
Air-Jet Unit Ups Cane Cleaning Efficiency	119								•
Air Motor-Driven Pump Moves Liquids From Drums	121	•	•	•	•	•	•	•	•
New Element Handles Difficult Solutions	121	•	•	•	•		•		•
Electrical Elements Heat Valve Parts, Products	123			•	•		•		•
Automatic Cap Tightener Is Portable, Adjustable	123			•	•				•
Air Transformer Operates Easily	123	•	•	•	•	•	•	•	•
Spiral Unit Spreads Malt Uniformly	125		•	•					
Heat Sealer Provides Air Pocket-Free Bond	125	•	•	•	•	•	•	•	•
Steel Sink Permits Working Flexibility	125	•	•	•	•	•	•	•	•
Filter Spray-Jets Quickly Cleaned	125		•						•
Non-Melting Refrigerant Can Be Re-Used	127		•		•	•	•	•	•
Roller Turntable Ups System's Versatility	127		•		•	•	•	•	•
Brake Motor Provides Immediate Stops	127	•	•	•	•	•	•	•	•
Easy Operation Marks Compact Labeler	129	•	•	•	•	•	•	•	•
Gun Injects Lubricants at High Pressures	129	•	•	•	•	•	•	•	•
Automatic Auger Feed Is Highly Accurate	129	•	•	•	•	•	•	•	•
New Model Fork Truck Is Light, Compact	129	•	•	•	•	•	•	•	•
Turning Forks Speed Lift-Truck Transfers	131	•	•	•	•	•	•	•	•
Mildew-Resisting Enamel Uses Non-Toxic Fungicide	131	•	•	•	•	•	•	•	•
Dual-Purpose Lubricant for "Stand-By" Periods	131	•	•	•	•	•	•	•	•
New Resin-Base Adhesive Minimizes Flash Hazard	131	•	•	•	•	•	•	•	•
Non-Toxic Insecticide Does Quick Job	131	•	•	•	•	•	•	•	•

PRACTICAL IDEAS

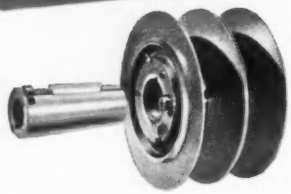
Can Filler Converted to Jug Filling	5		•				•		•
Loss of Keys and Time Circumvented	5	•	•	•	•	•	•	•	•
Tin Can Catches Debris From Drill	7	•	•	•	•	•	•	•	•
Home-Made Automatic Car-Coupler	7			•					•
Batch Scale Operation Improved	7	•	•	•	•	•	•	•	•
Economical Stand-By Pump Hook-Up	9	•	•	•	•	•	•	•	•
Rubber Plunger Aids Lubrication	9	•	•	•	•	•	•	•	•
Bag-Flattener Made From Crusher-Rolls	11			•			•		•
Lights Are "Watchmen" on Operations	11	•	•	•	•	•	•	•	•
Cuts Down-Time on Bucket Elevator	11	•	•	•	•	•	•	•	•
Sure Ways to Order and Cleanliness	13	•	•	•	•	•	•	•	•

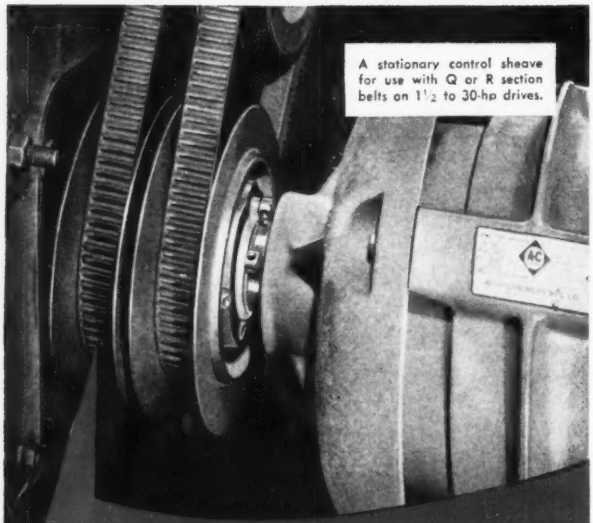
OTHER DEPARTMENTS

Editorials	133, 134	Hors d'Oeuvres	203	•	•	•	•	•	•	•	•
New Packages & Products	158	Schedule of Events	206	•	•	•	•	•	•	•	•
Advances in Technology	171	Recent Inventions	211	•	•	•	•	•	•	•	•
Questions & Answers	184	Men & Companies	214	•	•	•	•	•	•	•	•
Useful New Books	194	Just Off the Press	219	•	•	•	•	•	•	•	•
Keeping Up With Field	197	Advertisers Index	232	•	•	•	•	•	•	•	•
Output & Price Index	197	Free Reader Service Opp.	234	•	•	•	•	•	•	•	•

INDUSTRY INDEX

TEXROPE
Greatest Name in V-Belt Drives



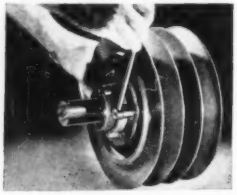


A stationary control sheave for use with Q or R section belts on 1½ to 30-hp drives.

NOW!
Wide Range Vari-Pitch Sheave has 3 New Advantages

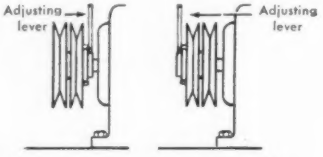
1 *Magic-Grip* Mounting

The widely used *Magic-Grip* tapered bushing is now supplied with the Wide Range *Vari-Pitch* sheave, making it the fastest mounting sheave of its type on the market. Turning only one screw makes or breaks the vise-like grip of sheave bushing on motor shaft.



2 Fast Adjustment

To change sheave diameter — thereby changing speed — simply turn a single adjusting screw, *using a lever rod* that slips through a hole in the head of the screw. No more fumbling with screw drivers. Adjustment is fast and accurate.



3 Adjusts From Either Side

Sheave can be mounted on motor shaft so adjusting screw is either toward or away from motor bearing, as indicated above. This feature is especially important in installations where space for adjustment is limited. It's the only sheave of its type with this feature.

GET COMPLETE DATA FROM YOUR NEARBY ALLIS-CHALMERS DISTRIBUTOR OR DISTRICT OFFICE, OR SEND COUPON.

ALLIS-CHALMERS
MILWAUKEE 1, WIS.

Send me complete specifications and engineering data on the new Wide Range *Vari-Pitch* sheave . . . 20S7811.

Name.....

Title.....

Company.....

Street.....

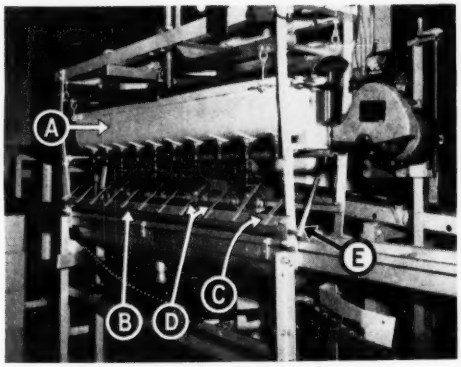
City.....State.....

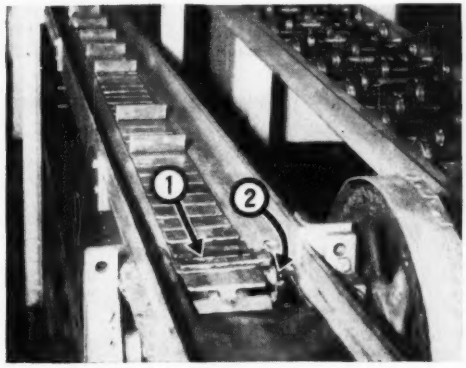
A-3841

Texrope, Vari-Pitch and Magic-Grip are Allis-Chalmers trademarks.

ALLIS-CHALMERS

PRACTICAL IDEAS





Can Filler Converted to Jug Filling

By installing a few inexpensive assemblies on our No. 10-can filling-machine, we were able to convert it to fill narrow-neck jugs accurately. Also, thereby, we changed an operation almost entirely manual to one largely automatic.

This is how No. 10 cans were filled:

Controlled flow of syrup into the scale-tank—(A) in left photo—was automatically stopped when the weight of the liquid equalled that required to fill ten cans.

Since the opening of the containers was large, accurate spotting of the cans under the ten spouts was unnecessary. However, exact centering was required for the conversion to small-mouth bottle filling.

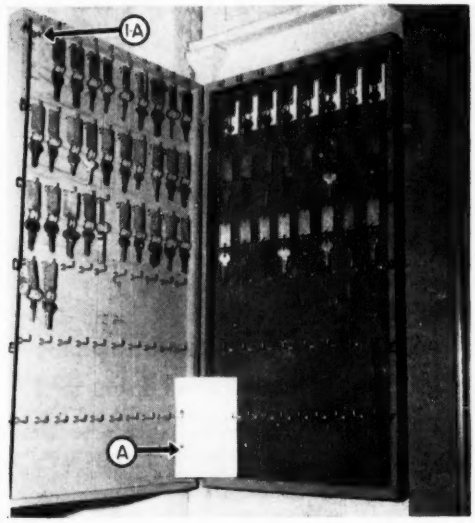
This was accomplished by installing a conveyor equipped with spacers for feeding the bottles to the filler. Adjustable guide rails controlled centering of jars with spouts, in direction of travel, so that they were delivered in approximate alignment. Then, to make the alignment exact, the pivoted angle-iron attachment (B) was now incorporated.

On the face plate (C) bolted to the pivoted angle-iron, tapered-end fingers (D) were riveted. Width of these is equal to the spacing necessary between each jar when correctly placed under the spouts.

Now, when the conveyor has brought ten bottles into approximate position for filling, pushing lever (E) lowers the spacing fingers between containers to shift them to exact filling location.

The next problem was to halt the conveyor when the jars were in approximate position under the filler. This was done by attaching a metal bar—(1) in right photo—to the surface of the conveyor, extending beyond it approximately 1 in., to trip switch (2) which stops conveyor.

Problem of timing is simply solved by adjustment of the extended bar and placement of the cut-off switch.—*C. Edgar Hires, Chief Engineer, Chas. E. Hires Co., Philadelphia.*



Loss of Keys and Time Circumvented

A simply constructed wall-cabinet, used as a central depository for keys, together with a workable filing system, has greatly reduced key loss at our plant. The system also speeds the time of opening a locked room or compartment, when the local key is lost or when there is only a central key for the locked area.

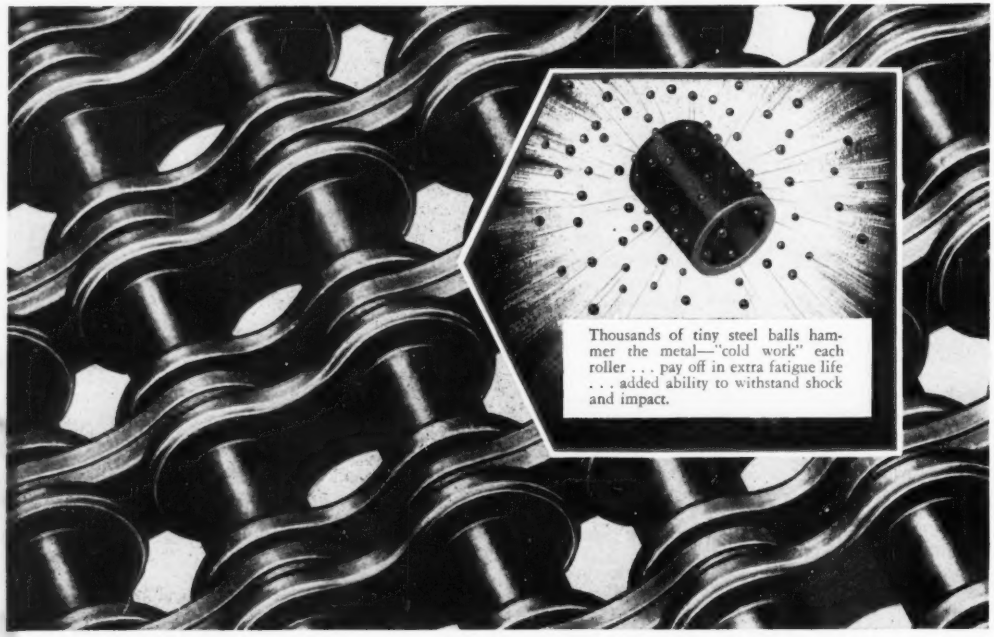
This is how the cabinet is constructed and how the system operates.

On both the door and bed of a shallow cabinet (see photo) are hooks on which keys are hung. Horizontal rows of hooks are lettered, vertical rows numbered, so that a key can be quickly located by its coordinate number. The letter-number combination and the location of the lock into which it fits, are stamped on the metal tag attached to each key.

An important part of the system is the directory of keys (A in photo), a copy of which is kept with the cabinet. This is indexed according to location of locks throughout plant.

When a key is off its hook an undue time, its absence is readily noted as shown by the empty hook for key 1-A in photo. Checking for its return is simple, since the borrower is known.—*Erik W. Holgren, Chief Engineer, Abbotts Dairies, Inc., Ice Cream Div., Philadelphia.*

Get the roller chain that gives you SHOT-PEENED rollers...


Thousands of tiny steel balls hammer the metal—"cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact.

look for the darkened rollers!

THERE are sound reasons for the universal acceptance of Link-Belt Precision Steel Roller Chain. Two of them—shot-peened rollers and Lock-type Bushings—are shown here.

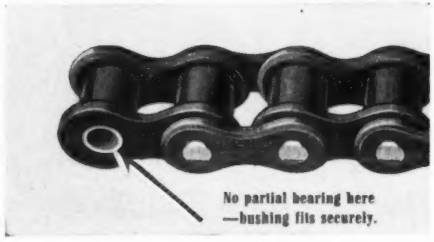
Others include Link-Belt's rigid material selection and controlled heat treating—your assurance of absolute uniformity with no weak members.

Whether it's for drive or conveyor service, you can get the best in roller chain from the complete Link-Belt line—single and multiple widths, in ⅜" through 3", and double pitch, 1" through 3". Next time you need roller chain, call the Link-Belt office near you.

LINK-BELT

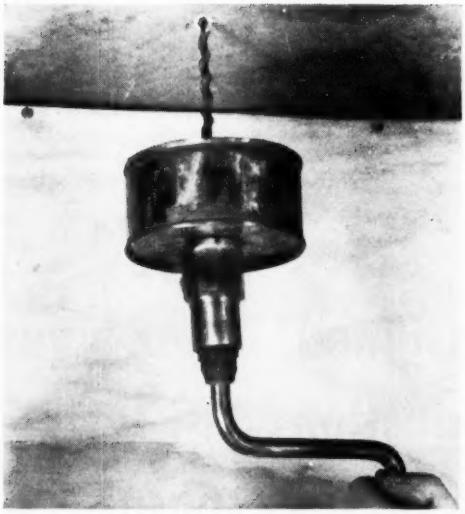
PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities. 12,897



Lock-type Bushings increase ability to withstand shock loads

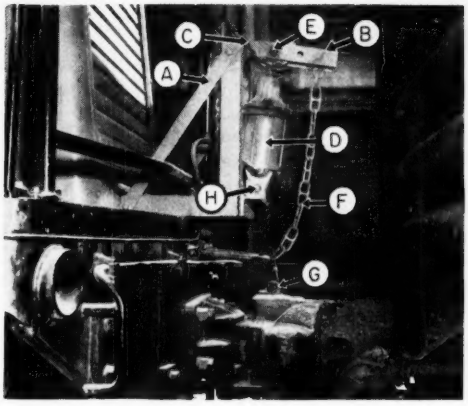
A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1" pitch and double pitch roller chains through 2" pitch.



Tin Can Catches Debris From Drill

A lidless tin can with a hole punched in the bottom, can be used to prevent plaster and wood particles from falling to the floor or onto equipment, when it is necessary to drill holes in the ceiling. Upturned empty can (see photo) serves as a catch-basin for the discharge of the bit.

The hole in the can bottom is made just large enough for the bit to pass through. However, to prevent can wobble or the sifting of dust through the hole in the can, strips of adhesive tape may be stuck to the can bottom and onto the chuck of the brace.—*Clifford T. Bowers, London, Eng.*



Home-Made Automatic Car-Coupler

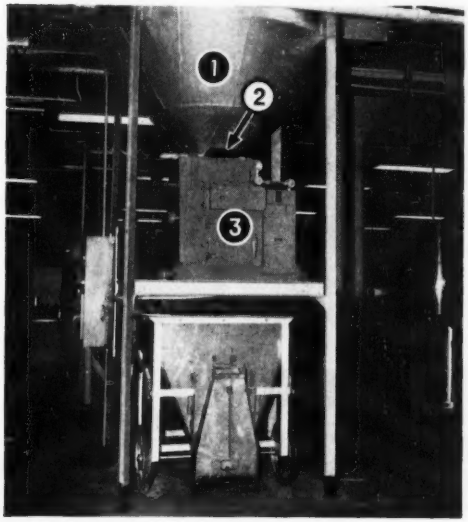
From pieces of angle and strap iron to which were attached an air cylinder, we fabricated a car-coupler that can be operated from the cab of our diesel powered switch-engine. This arrangement not only speeds the movement and spotting of cars but greatly reduces the hazard of accidents. Operators no longer have to step between engine and car during coupling and uncoupling.

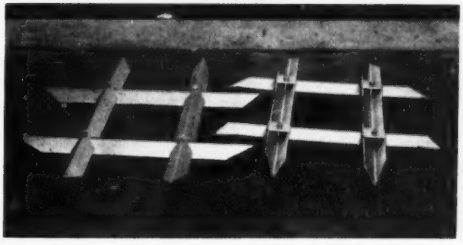
This is how the automatic device is fabricated and how it operates.

A frame—(A) in photo—of angle iron with strap reinforcement is mounted above the coupling on both ends of the engine. Then twin strips (B) are pivoted on a cross-rod of the frame at (C), so that when air is admitted to cylinder (D) its piston rod, pivoted at (E) raises the arm (B).

As this arm raises, lift-chain (F) pulls up the coupling pin (G), to disengage the car and engine. Since the piston rod end moves through a small arc, lower end of cylinder must be pivoted at (H).

Coupling cars is the reverse of uncoupling, except that the car coupling must be opened before contact between engine and car.—*F. A. Wenske, Assistant Superintendent, Plant Maintenance, Eastern States Farmers Exchange, Buffalo.*





Batch Scale Operation Improved

Merely by lowering grids, made of angle iron, into the bottom of hoppers feeding batch scales, we have improved our batch-weighing operation.

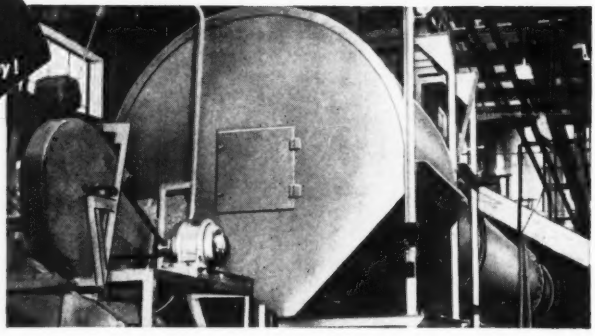
The head of sugar in the hopper—(1) in top photo—often constitutes considerable weight on the valve (2), opening of which delivers material to batch scales (3). The greater the head the greater the pressure on the valve, and the greater the load on the batch scale cut-off mechanism.

By placing angle-iron grids (lower photo) in the bottom of the hopper, the flow is retarded and some of the

See Louisville for
CREATIVE
DRYING
ENGINEERING

New Louisville "Job Designed" Dryer gives 50% more production...at lower cost...in less space

KNOW THE
RESULTS
Before You Buy!



FORMER DRYER

Installed cost	$60,000
Annual production (tons)	6,000
Drying cost per ton	4.65

(space required, 2500 sq. ft.)

LOUISVILLE DRYER

Installed cost	$15,000
Annual production (tons)	9,000
Drying cost per ton	1.15

(space required, 1000 sq. ft.)

YEARLY SAVINGS of LOUISVILLE DRYER in OPERATING COSTS ALONE $21,000

Other General American Equipment: Turbo-Mixers, Evaporators, Dewaterers, Towers, Tanks, Bins, Filters, Pressure Vessels

When production costs are eating up profits, here's something worth looking into. This food processor was using a large, costly installation for drying until he asked a Louisville engineer to survey his production.

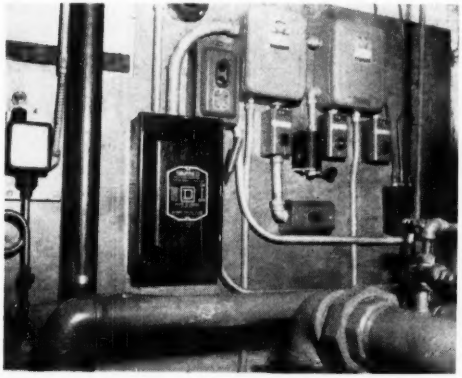
A dryer was designed specifically for his operations. Its performance was pre-determined in our own unique research laboratories and pilot plant. *The new dryer turns out better, more valuable production in less space—with great savings in annual operations.*

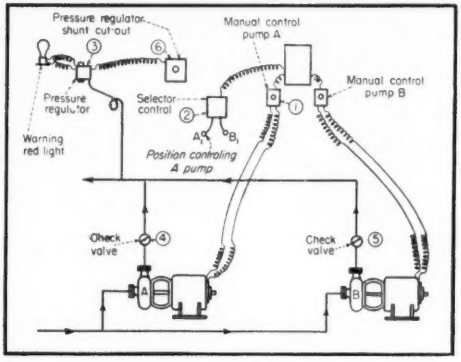
Without obligation ask a Louisville engineer to survey your drying methods.

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN

Louisville Drying Machinery Unit
Over 50 years of creative drying engineering
GENERAL AMERICAN TRANSPORTATION CORPORATION
Dryer Sales Office: Hoffman Bldg., 139 So. Fourth Street Louisville 2, Kentucky
General Offices: 135 South La Salle Street, Chicago 90, Illinois
Offices in all principal cities
In Canada: Canadian Locomotive Company, Ltd. Kingston, Ontario

load on the valve is absorbed. Accordingly, operation is smoother and there is less possibility of damage to the scale mechanism. — *D. B. Bradshaw, Plant Engineer, A. H. Johnson Co., Boston.*





Economical Stand-By Pump Hook-Up

Through a readily connected control system, which switches cooling-water pumping to a stand-by installation, upon failure of the primary, we are assured an uninterrupted supply of coolant.

Furthermore, by the weekly reversal of the function of each unit (from primary to stand-by and vice versa), the wear on pumps and motors has been minimized and working life extended.

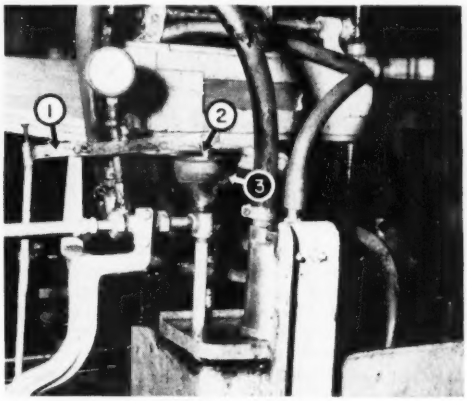
This is how assembly is hooked-up and how it operates.

Presume that cooling water is circulated by pump A (see sketch), the unit selected for the week by operating the pump's manual control (1). Starting takes place however, only after control selection switch (2) has been positioned for the operation of pump A's motor.

As long as the pressure in the cooling-water line is above 40 lb/sq. in., pump A operates as the primary pump. If, however, the line pressure drops below 40 lb., pressure regulator control (3), is operated to break pump A's motor circuit and close that of the stand-by pump B. Check valves (4) and (5) eliminate need for manual closing and opening of line valves.

In addition, whenever the control breaks the circuit of the primary pump motor, it also lights a red signal lamp over a nearby main passageway. Thus, the maintenance department is soon informed that there has been a failure of the primary pump.

Since the controls switch from one pumping unit to the other when line pressure is below 40 lb., starting would be difficult, were it not for the shunt-switch regulator-control (6). When starting a unit, the shunt-switch is closed to make the control (3) inoperative, until line pressure is above 40 lb.—*C. F. Rupper, Chief Engineer, J. O. Welch Co., Cambridge, Mass.*



Rubber Plunger Aids Lubrication

Frequent binding of a rocker-arm-operated rod, controlling delivery of vinegar-syrup to filling machines, was overcome in our plant merely by the addition of a household-type rubber plumbing plunger. The following tells how the problem was solved. *(Turn to p. 11)*

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

AUGUST PRACTICAL IDEA voted best was "Handy, Sanitary Barrel Dumper," submitted by J. L. Becker, Plant Manager, Maple Island, Inc., Stillwater, Minn. It told how a mechanical container-tipper has saved heavy labor in emptying large drums of food materials, while also preventing product contamination.

A NEW INSULATION

Armstrong's PLASTICORK

Armstrong's Plasticork is a brand-new, low-temperature insulation. It's a cork-and-rubber composition that can be applied to any cold line fitting. The workman molds a Plasticork fitting cover right on the job—builds it up by hand over the fitting to be insulated.

Where fittings are close to each other or to wall surfaces, Plasticork makes the work faster and easier. It does away with the time-consuming task of cutting each regular cover to fit these difficult places.

Waiting for special factory covers causes delay on many cork covering jobs, too. With Plasticork, special fittings can be insulated immediately. You don't need factory covers for them.

Plasticork has excellent insulation value. It's 80% cork by volume. Applied in the same thickness as the cork covering on the adjacent piping, its efficiency is comparable to factory-made cork covers.

With Plasticork, you get a neat job that's difficult to distinguish from conventional covers. Plasticork holds its moldable characteristics for years. It's an item you can stock and use any time to insulate any fitting. It can even be removed and used again without loss of workability or efficiency.

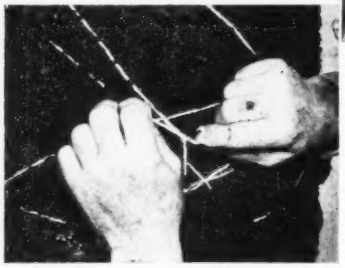
Plasticork is shipped in cardboard cartons containing 5, 10, 20, and 40 lbs. Weight is 15 lbs. per cu. ft. Sundries for application can be supplied on order.

SEND FOR FREE BOOKLET:

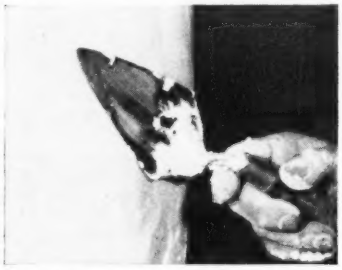
Get a complete description of Plasticork, plus application specifications and coverage data. Write today for the 8-page booklet, "Armstrong's Plasticork." Address Armstrong Cork Company, 2310 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATIONS

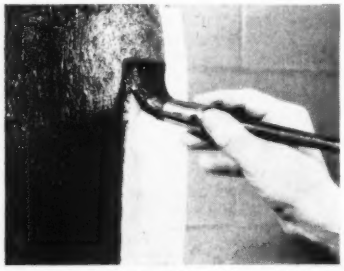
1. Plasticork is packed firmly about fitting that has first been coated with Plasticork Primer.



2. Plasticork is then molded to the proper thickness and held in place with either twine or tape.



3. A ¼" thickness of Keene's Cement is trowelled to a smooth finish directly over the Plasticork.



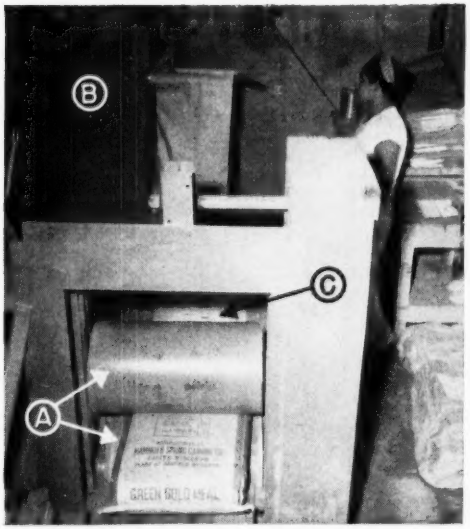
4. Two coats of Armstrong's Weatherproof Plastic are brushed on to provide a tight vapor seal.

Cam-operated rocker-arm—(1) in photo—pushes down a spring returned rod (2), which when depressed admits measured amounts of vinegar-syrup to jars of pickles. Periodically, congealed seepage of the vinegar-syrup around the rod caused it to bind.

To put an end to production interruptions caused by sticking rods, water was dripped on them. Though this procedure prevented rods from binding, water was continually splashed on floor and equipment.

Then, we slipped the rubber end of a household plunger (3), cup side up, over the rod housing and filled the cup with water. That ended both rod binding and messiness around the fillers.

Whenever water in the cup absorbs an appreciable amount of vinegar-syrup, it is easily removed by depressing a side of the rubber cup. Occasional draining of cup and filling with fresh water keeps the rod operating smoothly.—*Edward Schlorer, Production Manager, Mrs. Schlorer's Inc., Philadelphia.*

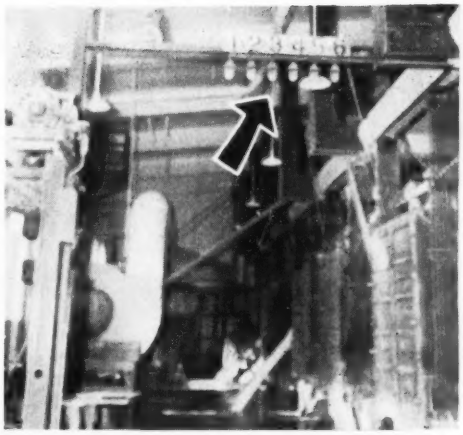


Bag-Flattener Made From Crusher-Rolls

By building a continuous bag flattening device from an old set of crushing rolls, we have effectively added 25 percent more space to our alfalfa-feed warehouse, and also greatly expedited handling of our finished product.

It was a simple matter to move two counter-rotating steel crushing rolls—(A) in photo—far enough apart in their bearing frame to permit 50 lb. multi-wall paper bags of feed to roll between for flattening. A ¾ hp. motor and chain drive were all the accessories needed to power these rolls, and by extending an endless canvas belt (C) from the packaging machine (B), to and around the lower roll, an automatic feed was obtained.

By thus flattening our bags we can now place 650 tons of product in a warehouse that previously was filled by 500 tons. Literally, we "created" space for 600 more bags. Further, the consistent new uniformity of filled-bag size has sped palletizing and stacking operations and eased the job of attendants.—*Clifford Gelhar, Manager Dehydrator Plant, Mammoth Spring Canning Co., Oakfield, Wisc.*

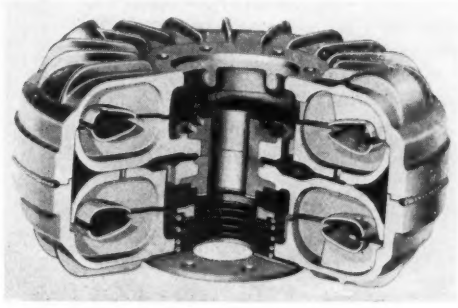


Lights Are "Watchmen" on Operations

By grouping, numbered lights over a passageway (see photo) and wiring these lights into the circuits of motors driving remotely located machines, operators can tell at a glance which units are running.

Employed at our plant with Entoleters, this system not only helps assure that all flour has passed through a larva-destroying machine before packaging, but also conserves operator man-hours.

It is now unnecessary to make frequent checks on units variously located. If, when a production line is running, a light is out, a failure is indicated—readily observed by any operator traveling the much-used passageway.—*J. George Kehr, Superintendent, Russell-Miller Milling Co., Buffalo.*



Cuts Down-Time on Bucket Elevator

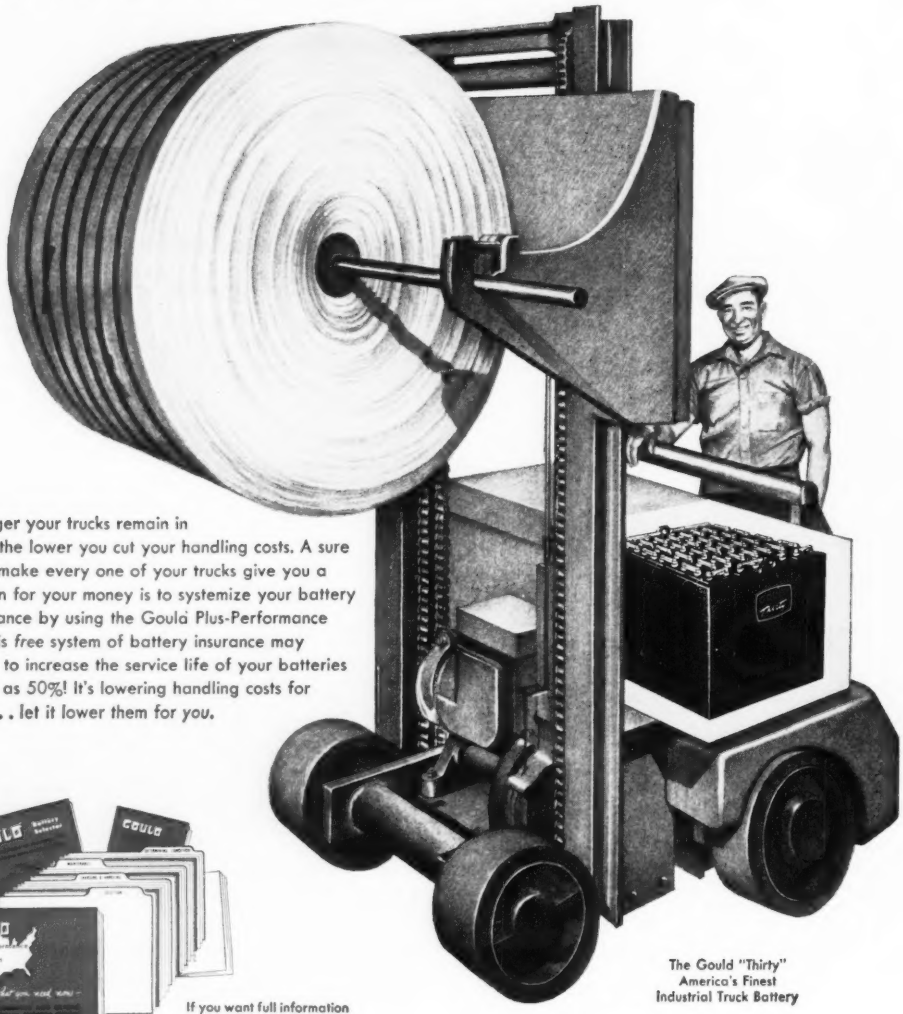
Heavy duty conveyor capacity was increased and maintenance reduced at American Sugar Refining Co., Baltimore, through the installation of a Twin Disk hydraulic coupling on the conveyor motor.

Normal vibration of the 140,000-lb.-per-hr. capacity elevator was heavy, starting torque excessive. Strain on the 20 hp. motor and drive mechanism caused breakage and frequent shutdowns, therefore repair costs were running high.

When the hydraulic coupling was installed on the drive, a 15 hp. motor proved adequate for smooth operation. Now, complete elimination of motor and transmission troubles due to vibration or overload are claimed.

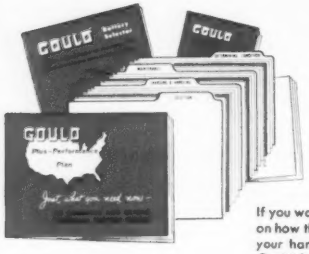
SYSTEMIZE BATTERY CARE...

Get a Good Run for Your Money!



The Gould "Thirty"
America's Finest
Industrial Truck Battery

The longer your trucks remain in service, the lower you cut your handling costs. A sure way to make every one of your trucks give you a good run for your money is to systemize your battery maintenance by using the Gould Plus-Performance Plan. This *free* system of battery insurance may be able to increase the service life of your batteries as much as 50%! It's lowering handling costs for others . . . let it lower them for *you*.



If you want full information on how this plan can lower your handling costs, write Gould Battery Information Headquarters.

GOULD *Industrial Batteries*

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

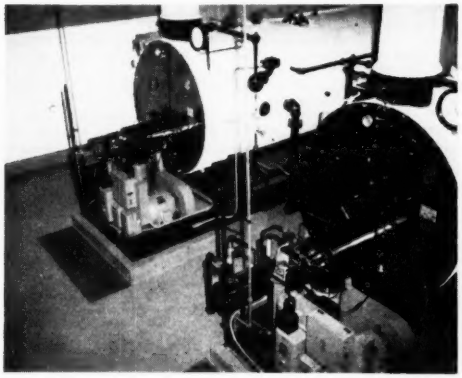
Sure Ways to Order and Cleanliness

You can, of course, strive for a spic-and-span plant, section, or department, by establishing rules and regulations, posting edicts, and issuing threats when these don't work. But if you do, don't bank on 100 percent results. Human nature is too much a variable for such good response to these methods.

There is a better way to attain a high standard of order and good housekeeping. And results, though not guaranteed to reach that 100 percent, will not be far below. Three examples, found practical in an East Coast plant, will illustrate this tactful approach—one that merely consists of making order convenient, disorder obvious, and good housekeeping easier than slovenliness.

Least Seen—Most Clean

Many a food plant boasts of its immaculate processing housekeeping but seems to lack pride in the appearance of its power plant—the area rarely inspected by visitors or employees. To be sure, this is not true of all plants, but



in far too many instances it is. Frankly such conditions need not be. And because of their bad impression on employees, they should not be.

To make power-plant housekeeping measure up, first clean and paint, being generous and thorough. Then follow up by polishing (see accompanying photo).

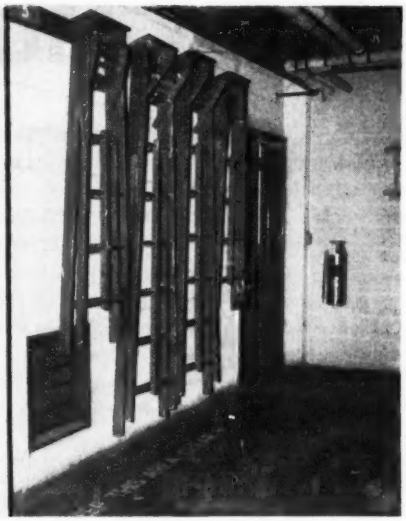
You will be surprised at results. Once thoroughly cleaned and polished, it's a good bet no further demand, prod, or request will be needed. Example and pride will maintain it.

No More Lost or Forgotten Ladders

In this plant, maintenance tools and equipment, particularly step ladders, were elusive—usually finally found where last used, or tucked away in some nearby cubicle. Rarely were they readily available when needed. Lost time accompanied disorder. That was before a place was designated for storage of ladders, with means installed for keeping them in place.

Provided was a long rack (photo) from which ladders could be suspended. Numbered to correspond to numbered location on the rack, the ladders were then assigned to individuals or crews.

Just a glance reveals a missing ladder—and the number suggests who has it and where it may be found. If at the end of a shift there is a vacant berth on the rack, the culprit is obvious, to his discredit. Ladders now have the stay-at-home habit.

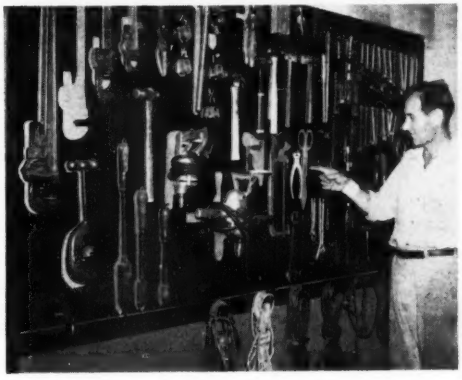


There is another advantage in bringing order to ladder use and storage. The ungainly contraptions can be a safety menace. If stored opened and upright they occupy too much space and may be knocked over with unpleasant, if not serious results. Piled on the floor, they can be stumbled over. But racked, they're safe, in least space.

Order Out of Chaos in Toolroom

Tools used both in the machine shop and for repairs throughout the plant were, like the ladders, too often not where they should be. If the tool wanted was in the repair shop piled with others in a drawer or box, sorting to locate the one needed consumed time.

Since hanging a tool-rack (photo) on a handy wall, with the outline of each tool painted on it in white on a



black background, any missing tool is readily spotted. And today it's very uncommon to find any white patchs showing at closing time.

Tools are now available when needed, or easily located. And though occasionally one is misplaced, rarely are any lost. Important also, is the fact that tools in place in their berths are generally clean tools. Personal pride, not executive orders, can be credited.—*FE Staff*

HOW MUCH DO FILTER

Have you ever thoroughly investigated both the direct and indirect cost of filter cloths in your plant? If not, the chances are you will be surprised to find that annual cloth replacement and maintenance cost alone runs from $1.00 to $4.00 per square foot of press area per year, depending on the utilization of your press, the product and the type of fabric you use.

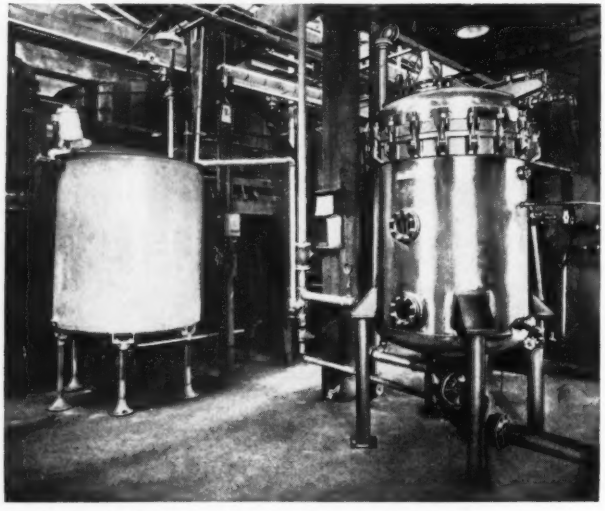
Other costs associated with use of cloths, such as the labor for scraping, handling, washing; breaking and redressing the press; and purchasing time expended in obtaining the cloth you need when you need it will probably be even greater, even if not as easily pinned down.

Here then are three immediate reasons why you should consider switching to modern high-speed Stainless Steel Niagara pressure leaf filters:

1. Niagara filters require no filter cloths. Accurate case histories in our files show that some plants amortize their Niagara filters in a few years on this saving alone.

2. Niagara filters require less labor. When you eliminate filter cloths, you eliminate the back-breaking and costly labor that goes with them. With Niagaras you get a quick, easy, clean operation that takes only a few minutes for one man between cycles.

3. Niagara filters work harder for you. Reduced downtime means more production time and higher production at your filter station. The filter works for you more hours per day—gives you many more gallons throughput with less installed filter area.



COST OF THIS NIAGARA "Auto-Sluice" filter, which removes impurities from weak pectin liquor, was amortized by user in less than one year, out of savings over previous filtration methods.

By switching to Niagaras, many press users have realized over-all savings that amortize the cost of the new filters in months, as well as unsanitary conditions.

Entirely aside from savings, here are eight sound reasons for installing Niagara filters:

1. No cloth pollution. Since there are no cloths to handle, the danger of contamination from handling is completely eliminated.

2. Sparkling filtrate clarity. Positive removal of solids to practically any degree of clarity you desire—one filtration is usually sufficient to obtain 0-0 bacteria count.

3. No leakage. Fully enclosed, pressure-tight construction eliminates drippage and loss of product at the filter station.

4. Stainless steel construction. Stainless steel at all liquid contact points (also available in nickel, monel, or the metal of your choice).

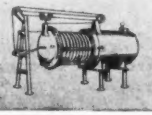
5. One-man operation and cleaning. Single or multiple units can be operated and cleaned easily by one man. The entire leaf battery is accessible for easy cleaning.

6. Higher flow rates on an equal area basis. Niagaras normally give flow rates 2 to 5 times greater than conventional cloth covered Filter Press.

7. Excellent cake-washing characteristics. Nearly true displacement washing is obtainable. This means minimum product loss in the filter cake.

8. Wide capacity range. Sizes range from 20 to 950 square feet of filter area, with average capacity of 10 to 425 GPM in one compact unit. (Even larger areas are available in the new horizontal filter shown at right on the opposite page.)

Niagara Filter CORPORATION

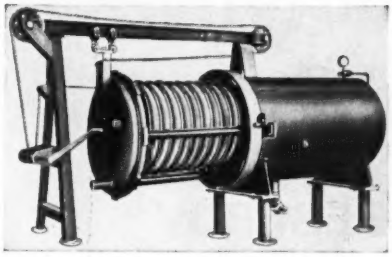


HORIZONTAL for non-aqueous liquids; high solids; cake recovery.

IN EUROPE—NIAGARA FILTERS EUROPE, 36 Leidsegracht, Amsterdam-C, Holland

CLOTHS COST YOU?

NEW NIAGARA STYLE H* FILTER
Low cleaning time . . . no cloth cost



This new Niagara filter answers the need for a filter which can quickly discharge large quantities of semi-dry cakes. A variation of the standard Niagara design, it still retains all the basic advantages of Niagara vertical pressure leaf filters.

A retractable carriage permits all leaves to be withdrawn at once for rapid cleaning. One man can easily discharge as much as 150 cu. ft. of cake in a matter of minutes.

A new closure design, the Q/O* (quick-opening) cover, permits faster, easier opening and closing than ever before in a filter of this size.

The Style H filter, available in sizes up to 1500 sq. ft., is ideal for filtration where high percentages of solids must be removed or where solids must be saved. It is also recommended for all standard liquid clarification where low headroom or other special reasons make its horizontal construction preferable to a vertical filter.

*Trade Mark Patent Applied For.

HOW THE NIAGARA FILTER WORKS

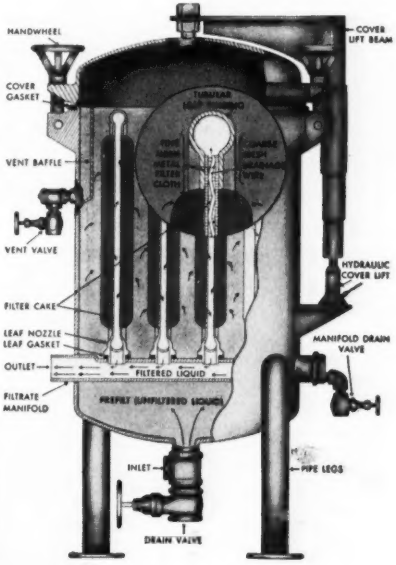
The leaves, which are the heart of the filter, consist of double-faced screen assemblies bounded by a tubular drainage frame leading to an outlet nozzle.

The unfiltered liquid with filteraid in suspension, is pumped into the closed pressure filter tank in which the leaves are placed. Liquid is forced through the fine-mesh screens, on which the filter cake is formed by the solids in the liquid.

Only the clear liquid reaches the inside of the leaves, flowing through the coarse center drainage wire to the tubular frames, and out through the leaf nozzles to the manifold.

When the batch has been completely filtered, or when the cake has nearly filled the space between the leaves, the filter is emptied and the filter cake is sluiced from the leaves with a hose or with automatic high-pressure sprays. Sluicing is done without removing any parts from the filter.

As a rule, the filter is ready to go to work again in 15 minutes to one hour, depending on its size.



THESE 5 SERVICES HELP MAKE HIGH-SPEED, LOW-COST FILTRATION A REALITY IN YOUR PLANT:

1. Nationwide field service. Niagara representatives in 24 cities know filtration and can give you facts.

2. Modern filtration laboratory determines your requirements accurately by test-filtering samples of your materials.

3. Pilot filter rental plan enables you to "preview" Niagara performance in your plant, at low cost.

4. Custom engineering. A single filter or a complete system, designed for your needs and built in materials of your choice.

5. Installation and start-up are supervised by Niagara factory engineers, always on call.

PILOT FILTER duplicates operation of large production models.

Operating figures prove the economic soundness of replacing cloth-covered presses with Niagara filters. For details, write us today. Or mail the coupon for descriptive literature.

STANDARD VERTICAL —for clarification and "polishing".

"AUTO-SLUICE" for fully automatic cake sluicing.

NIAGARA FILTER CORP., 3085 Main St., Buffalo 14, N. Y.

Please send: ☐ General literature; ☐ Data on horizontal filters; ☐ Data on pilot filter rental

Name_____

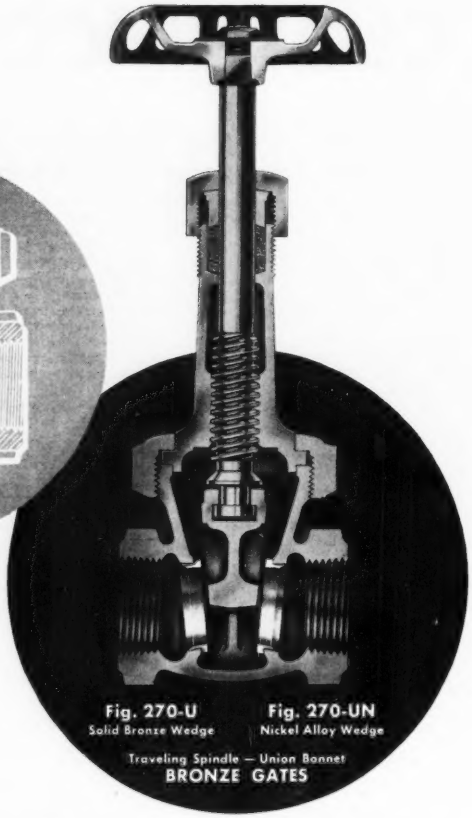
Title_____

Company_____

Address_____

City_____ Zone___ State____

Built-in $AVING$ make JENKINS BRONZE GATES your BEST BUY



Look over any of the 35 patterns in Jenkins complete line of Bronze Gates. You'll find *savings* built into every valve. Jenkins valve specialists designed each one for easy maintenance and extra long wear. Try them on your toughest services and see why they take top-rating in any test for endurance and economy. Jenkins Bros., 100 Park Ave., New York 17.

Jenkins Bronze Gate folder shows the many types available — lists convincing reasons why they are your best buy for any service. Ask for Form 181-A.

Typical of Jenkins design for built-in savings are the Fig. 270-U and Fig. 270-UN Gates for 200 lb. Steam, 400 lb. O.W.G. services.

MONEL AND BRONZE SEATING COMBINATION In Fig. 270-U a high quality bronze wedge seats against MONEL rings expanded in the body. The wedge takes the wear — it can easily be replaced when necessary by slipping a new one on the stem. Fig. 270-UN, with a nickel alloy wedge, is recommended for exceptionally severe conditions of rapid wear and corrosion.

These and other features of rugged construction make Figs. 270-U and 270-UN first choice for economy where conditions are most destructive to valves, as in oil refineries, dye houses, chemical, food, and rubber plants.

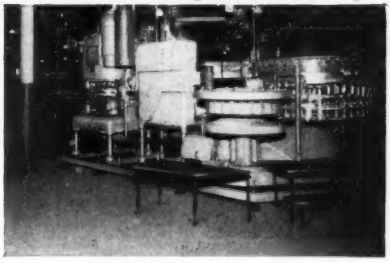
JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS

TOUGH FLOORS FOR TOUGH CONDITIONS

FEREM BLUE TEMPER FLOORS

Smith Dairy Products Co.
Bottling house of Miller Brewing Co.



In your plant you can have dense, ductile heavy duty floors, showing no noticeable wear for long periods and involving practically no upkeep costs, even when subjected to abrasive traffic and shock. Such floors are constructed with Ferem, the "Blue Temper" component in the floor topping, replacing sand, stone and silica. Ferem is used in heavy duty floors, loading platforms, corridors and runways in newly constructed buildings, or when replacing worn or eroded floors. Ferem is resistant to the corrosive action of chemical solutions . . . and has proven satisfactory under the wet floor conditions of many industries.

USED BY

Breweries, Beverage Plants	Chemical Plants
Distilleries	Industrial Plants
Dairies	Municipal Plants
Packing Houses	Paper Mills
Canning Plants	Railroads

HORN

A. C. HORN COMPANY, Inc. est. 1897

Manufacturers of materials for building maintenance and construction
LONG ISLAND CITY 1, N. Y. • Los Angeles • San Francisco • Houston
Chicago • Toronto SUBSIDIARY OF SUN CHEMICAL CORP.

A. C. HORN COMPANY, INC.,
Long Island City 1, N. Y.

FE-2

Please send me ☐ complete data on FEREM FLOORS

☐ free copy of your 96-page Construction Data Handbook

NAME_____ TITLE_____

FIRM NAME_____

ADDRESS_____

CITY_____ STATE_____

FABREEKA

The Original

"THIN PLY"

CONVEYOR and TRANSMISSION

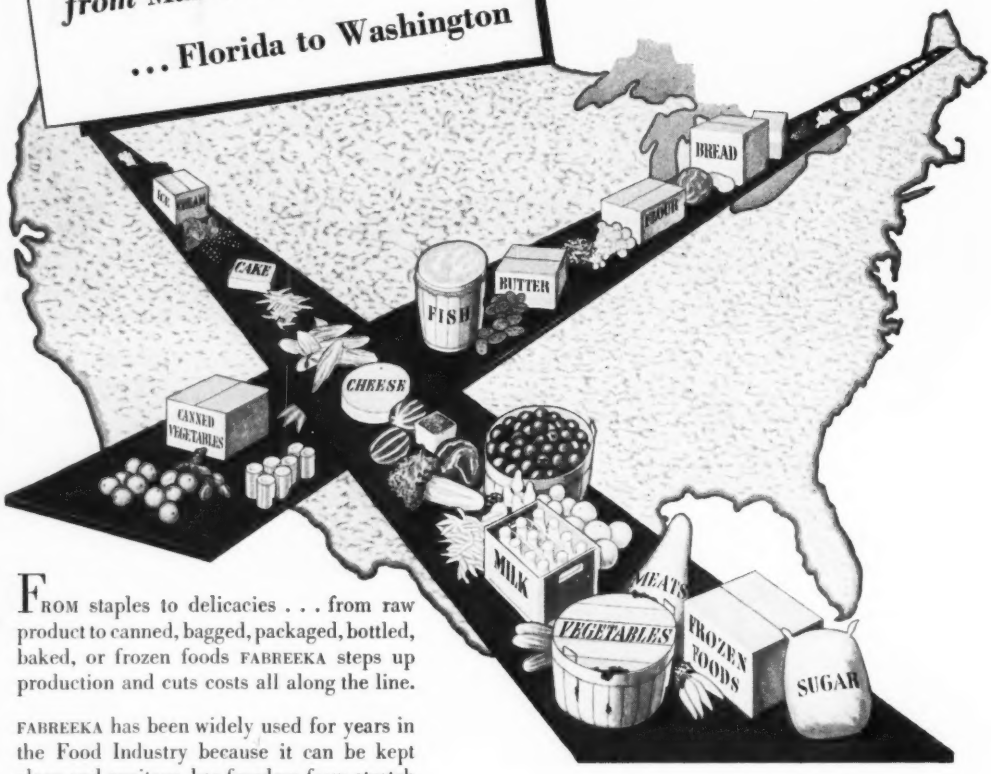
BELTING

Since 1918

The FINEST FOOD BELT

from **Maine to California**

... Florida to Washington



FROM staples to delicacies . . . from raw product to canned, bagged, packaged, bottled, baked, or frozen foods FABREEKA steps up production and cuts costs all along the line.

FABREEKA has been widely used for years in the Food Industry because it can be kept clean and sanitary, has freedom from stretch and shrink, resists extreme heat, cold, water, brine, and chemicals encountered in the industry. Made of specially woven cotton duck and rubber, — FABREEKA Belting is True-tracking, Flexible and has Great Strength and Long Life . . .

You can eliminate costly start-up delays with FABREEKA!

FABREEKA PRODUCTS COMPANY, INC.

222-F Summer Street, Boston 10, Massachusetts

NEW YORK CHICAGO DETROIT SPARTANBURG PHILADELPHIA PITTSBURGH OAKLAND

STOP
FOOD SPOILAGE!

We all like to eat, but how many of us appreciate the important part chemistry plays in keeping our foods flavorsome and safe from spoilage? It takes extensive research and testing programs by food manufacturers to achieve these ends. Products developed by the chemical industry have helped in many ways to speed this progress.

Heyden is proud of the contributions made by its fine chemicals especially adapted to food uses. Its Sodium Benzoate, for instance, has long been used to stop food spoilage and to preserve the flavor of many foods and beverages. Other products that have been developed and manufactured in highest purity by Heyden also enhance the keeping qualities and enjoyment of foods.

SODIUM BENZOATE

U.S.P. Powder and fast dissolving Flakes. Long established preservative for many foods and beverages. Shipped in 100, 50 and 25 lb. fiber drums.

BENZOIC ACID U.S.P. Powder and Crystals. Used as preservative in same way as sodium salt. Shipped in 100, 50 and 25 lb. fiber drums.

BENZALDEHYDE N.F. Grade. For flavor and aroma in foods, candies and beverages. Shipped in 425 lb. drums, 50 and 25 lb. tins.

METHYL SALICYLATE U.S.P.—Synthetic oil of wintergreen. For flavoring confectionery and beverages. Shipped in 500 lb. drums and 50 lb. tins.

PROPYL GALLATE—A highly effective antioxidant for retarding rancidity of lard and other edible fats and oils. Shipped in 200, 100, 50 and 25 lb. fiber drums.

SACCHARIN and SACCHARIN SODIUM Sweetening agents in special foods for restricted diets. Shipped in 100 and 25 lb. fiber drums.

* * *

Samples sent promptly on request.

FINE HEYDEN CHEMICALS

HEYDEN CHEMICAL CORPORATION
342 Madison Avenue, New York 17, N. Y.
CHICAGO • PHILADELPHIA • SAN FRANCISCO • DETROIT • PROVIDENCE

Serving Industry through Finer Chemicals

Benzaldehyde • Benzoates • Benzyl Chloride • Bromides
Chlorinated Aromatics • Creosotes • Formaldehyde • Formic Acid
Glycerophosphates • Guaiacols • Hexamethylenetetramine
Medicinal Colloids • Methylene Disalicylic Acid • Paraformaldehyde
Parahydroxybenzoates • Penicillin • Pentaerythritols • Propyl Gallate
Resorcinol • Salicylates • Salicylic Acid • Streptomycin

take a CLOSER LOOK at B&W STAINLESS TUBING

... and your FABRICATING OPERATIONS

Fast, economical, and satisfactory fabrication of stainless tubing calls for a close watch between its tough working properties and the production methods required to work the tubing to specific job requirements. It is well to bear in mind that the large number of available stainless analyses vary widely in their hot and cold working properties, as well as in their chemical and physical characteristics. Matching the workability of both seamless and welded stainless grades to spinning, swaging, expanding, upsetting, bending, forming, and other fabricating methods is a specialty at B&W.

Whenever you have a question concerning stainless tubing fabrication — for mechanical or pressure applications—you can count on Mr. Tubes—your local B&W Tube Representative to come up with a sound, practical answer. The incomparable technical service to stainless tube users he represents has saved production time, money, and materials for many a fabricator of stainless tubing.

Always a handy reference on ordinary fabricating techniques is Technical Bulletin TB-1. Send for a copy.

B&W STAINLESS CROLOY TUBING

B&W Croloy	AISI Type No
Croloy 18-8 H-C	302
Croloy 18-8 Si	302B
Croloy 18-8 F-M	303
Croloy 18-8 S	304
Croloy 18-12	305
Croloy 20-10	308
Croloy 25-12	309
Croloy 25-12 Cb	...
Croloy 25-20	310
Croloy 16-13-3	316
Croloy 16-13-3 Cb	...
Croloy 18-13-3	317
Croloy 18-8 Ti	321
Croloy 18-8 Cb	347
Croloy 12 T	403
Croloy 12	410
Croloy 12-2	414
Croloy 12 Al	405
Croloy 18	430
Croloy 22	443
Croloy 27	446

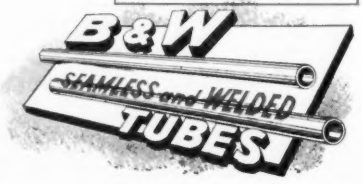
THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

General Offices & Plants

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

Sales Offices: Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill.
Cleveland 14, Ohio • Denver 1, Colo. • Detroit 26, Mich. • Houston 19, Texas
Los Angeles 17, Cal. • New York 16, N. Y. • Philadelphia 2, Pa.
St. Louis 1, Mo. • San Francisco 3, Cal. • Syracuse 2, N. Y.
Toronto, Ontario • Tulsa 3, Okla.



TA-1682S

you get SPARKLE plus

outstanding moisture resistance

with packages of

ALCOA ALUMINUM FOIL

Moisture-absorbing products like Nurish Plant Food need *special* protection to assure peak performance.

Used by itself, or laminated to other protective materials, Alcoa Aluminum Foil forms an outstanding moisture-vapor barrier that guards freshness . . . in transit, in storage, on the shelf. And in appearance, nothing outshines the sales appeal of this sparkling wrap.

Alcoa and its converters—the nation's leading packaging producers—are continually developing new ways to package products better . . . in foil and foil laminates. For full information on advantages and applications just call your local Alcoa sales office or write:

ALUMINUM COMPANY OF AMERICA
1763-K Gulf Building • Pittsburgh 19, Pa.

Foil envelope manufactured by Shellmar Products Corp.

ALCOA
ALUMINUM

"SEE IT NOW" with Edward R. Murrow—CBS-TV every Sunday... brings the world to your armchair. Consult your newspaper for local time and channel.

This is Why the Nash is the Most Simple Compressor

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

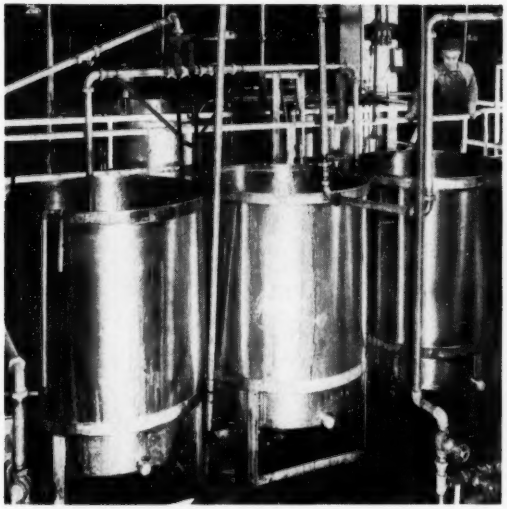
Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

313 WILSON, SO. NORWALK, CONN.

For "production-line" processing of fruits and juices you can't beat STAINLESS STEEL



GRAPE MASH AND FILTER cel used for clarifying are mixed in these three 500-gallon Stainless Steel tanks and in the two 1000-gallon tanks in the rear. Tanks were manufactured by Lee Metal Products Company, Philipsburg, Pa.

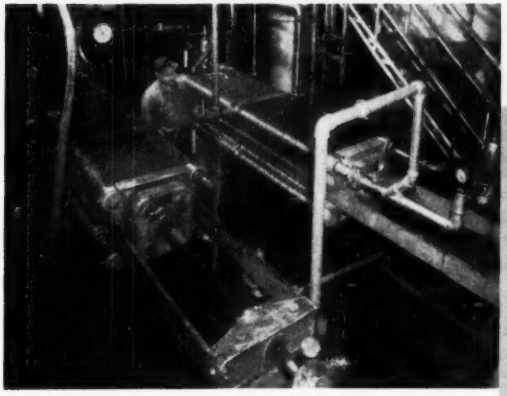
▶ Handling highly-acid fruits and juices introduces a "double-barreled" problem as far as equipment is concerned. The equipment must be unaffected by the acid content of the product and, in turn, must have no contaminating action itself. It's a job ready-made for Stainless Steel.

At its North East, Pa., plant—said to be the largest grape juice products plant in the world—The Welch Grape Juice Co., Inc. uses Stainless equipment from one end of its continuous processing operation to the other.

Grape mash and clarifier are mixed in Stainless Steel tanks and piped to the press room through Stainless transfer lines. Shaker, holding tanks, pasteurizers, heat exchangers, eight 156,000-gallon storage tanks and three 225-bottle-per-minute fillers are all Stainless Steel. From mixing to bottling, the grape juice touches nothing but Stainless Steel except while in the press blankets. And these blankets are washed in Stainless washers.

Production in this plant is a continuous operation, and it's kept really continuous by Stainless Steel's ease of cleaning, its freedom from maintenance and replacement and its resistance to the corrosive effects of fruit acids.

No matter what type of food products you process, you'll find there's nothing like Stainless Steel for smooth, uninterrupted operation without concern over product contamination. And for the finest performance, insist that your equipment fabricator use U·S·S Stainless Steel.



INSTALLED IN 1946, this Walker-Wallace low-pressure Stainless Steel plate-type pasteurizer feeds juice to the Stainless tube-type heat exchanger at the right.

STAINLESS STEEL press blanket washers, made by Troy Laundry Machinery Division of American Machine & Metals, Inc., East Moline, Ill., wash a load of 14 blankets from one press in 12 minutes. In service three years, they replaced wooden washers that were subject to shrinkage, rotting and leakage.

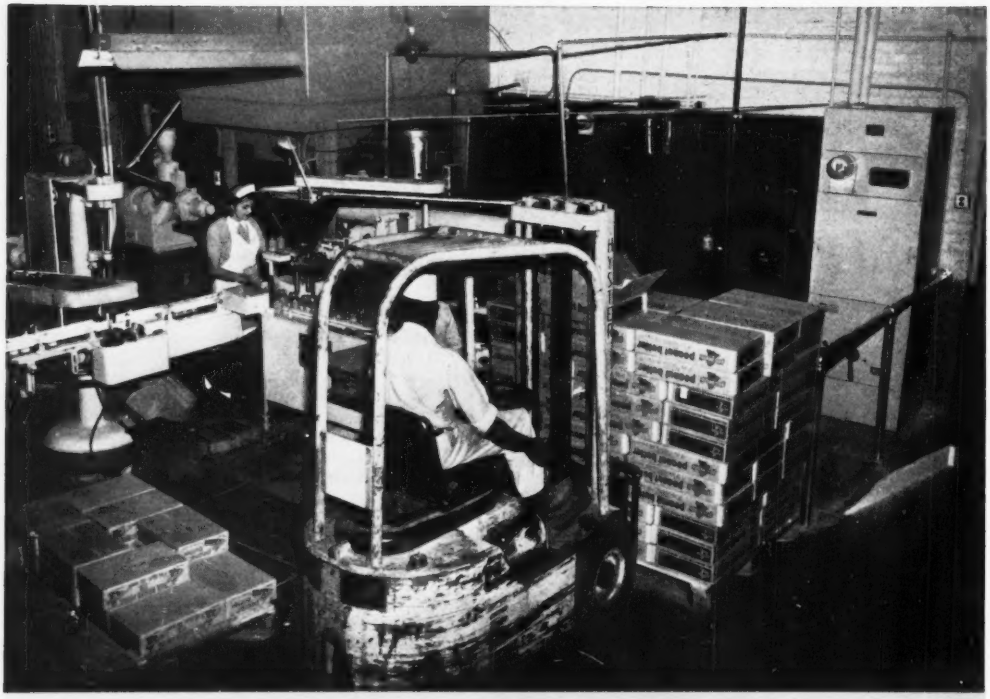
UNITED STATES STEEL COMPANY, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

2-1499

UNITED STATES STEEL



Many FOOD MANUFACTURING PLANTS *Use*

HYSTER® 20 Lift Trucks

HYSTER 20 (2,000 lbs. capacity) comes in 6 model variations. The complete Hyster line has capacity ranges from 1,000 lbs. to 30,000 lbs. Write for literature.

MATERIALS HANDLING SUPERVISORS like the Hyster 20 because it transports fast, stacks high, gets in and out of tight places, rolls on pneumatic tires; is rugged and powerful.

OPERATORS like it because Hyster steers easily, carries and lifts loads smoothly, takes indoor and outdoor jobs in stride.

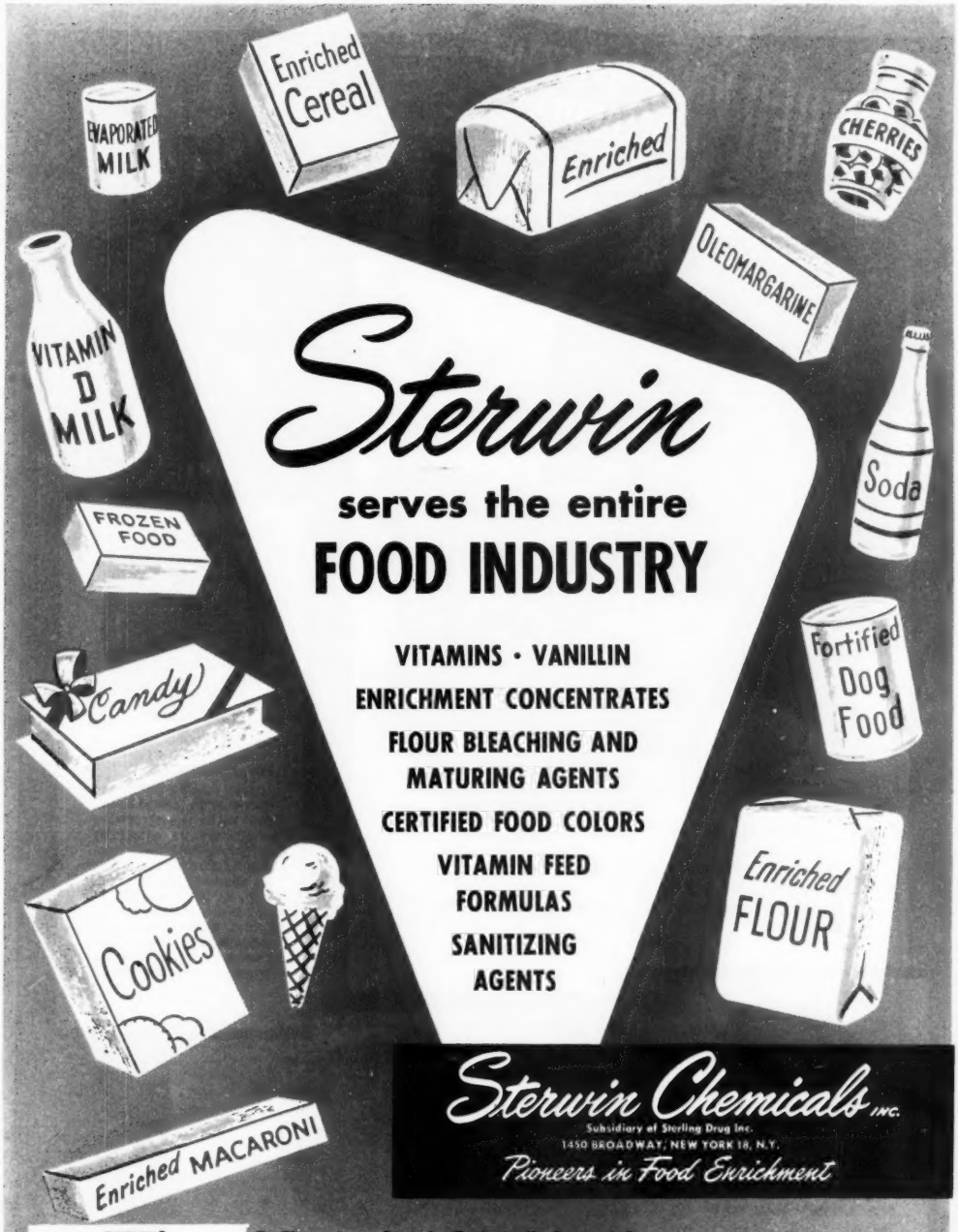
MANAGEMENT likes it because Hyster deals a low blow to materials handling costs — slashes manufacturing and warehousing overhead and adds to net profits.

See your Hyster dealer for an eye-opening demonstration and a list of owners. Or write for literature.

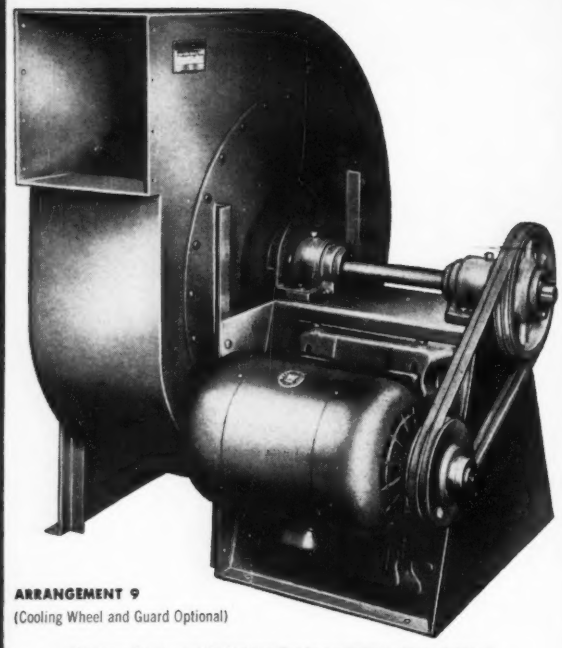
HYSTER COMPANY

THREE FACTORIES

2902-35 N. E. CLACKAMAS, PORTLAND 8, OREGON
1802-35 NORTH ADAMS ST., PEORIA 1, ILLINOIS
1010-35 MYERS STREET... DANVILLE, ILLINOIS


Enriched Cereal
EVAPORATED MILK
Enriched
CHERRIES
OLEOMARGARINE
VITAMIN D MILK
Sterwin
serves the entire
FOOD INDUSTRY
Soda
FROZEN FOOD
VITAMINS • VANILLIN
ENRICHMENT CONCENTRATES
FLOUR BLEACHING AND MATURING AGENTS
CERTIFIED FOOD COLORS
VITAMIN FEED FORMULAS
SANITIZING AGENTS
Fortified Dog Food
Candy
Enriched FLOUR
Cookies
Sterwin Chemicals INC.
Subsidiary of Sterling Drug Inc.
1450 BROADWAY, NEW YORK 18, N.Y.
Pioneers in Food Enrichment
Enriched MACARONI
NEW!
FOR MARGARINE
VITAMIN A and COLOR
COMBINED
BATCH PACKED!
● There is a Sterwin Technically-Trained Representative in your area. Let him show you how to put Sterwin products, service and research to work in your plant. Or write direct to: Sterwin Chemicals Inc., 1450 Broadway, New York 18, N. Y.
BRANCH OFFICES:
Atlanta, Boston, Buffalo, Chicago, Dallas, Kansas City (Mo.), Los Angeles, Minneapolis, Portland (Ore.), St. Louis

ANOTHER NEW STURTEVANT DEVELOPMENT!

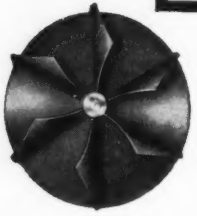


ARRANGEMENT 9
(Cooling Wheel and Guard Optional)

The new Sturtevant Industrial Fan is available in four standard arrangements and a choice of three wheel types. It can be furnished for chain or belt drive as well as direct-connected motor drive.

FOR EXHAUSTING
The Air Handling Wheel, with its backwardly inclined blades, gives you the highest operating efficiencies on the market today for general industrial air handling. It is particularly suitable for exhausting smoke, fumes, gases and light dusts from industrial processes as well as for oven circulation, heat treating and drying applications. Power consumption is low over a wide range of volumes and pressures.

FOR MATERIAL HANDLING
The Material Handling Wheel is a heavy-duty, radial-bladed, side-plate type designed for general purpose material handling. It is especially applicable to grinding and buffing wheel exhaust systems, and for conveying such materials as sawdust, granular particles and chips. This wheel combines high fan efficiency with its material handling features.



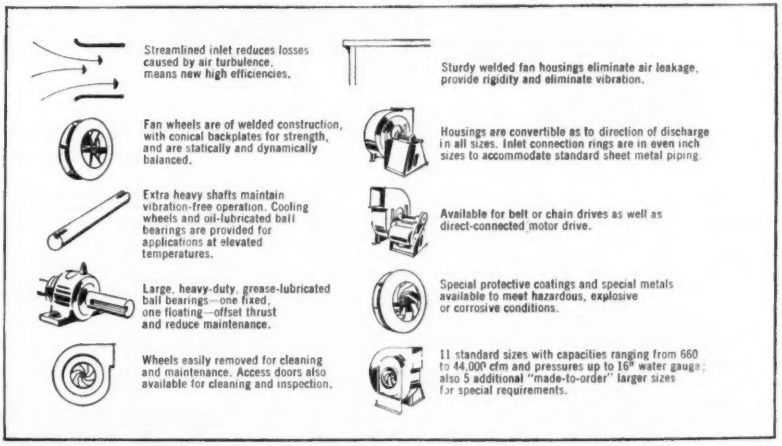
FOR SPECIAL APPLICATIONS
The Long Shavings Wheel is a material handling wheel without side plate. It has been designed particularly for those material handling jobs where long, stringy materials must pass through the fan.

BUY A BETTER
INDUSTRIAL FAN
to do all these jobs:

1. Handle Air, Exhaust Fumes, Gases, Smoke
2. Remove Metal Dust, Chips, Sawdust, Grains
3. Convey Long, Fibrous Materials

Never before have you been able to find the combination of ruggedness, flexibility and high efficiencies now available in this new Industrial Fan. It has been designed for hard work—and *performs* on rough, tough industrial air handling jobs. It will help you to reduce operating costs by eliminating the manual or mechanical handling of many types of materials. It will help you to eliminate hazards and improve working conditions by exhausting fumes, dusts and vapors and performing many similar applications—all with a minimum of maintenance.

Here are ten top features which mean high efficiency, flexibility, and long life:


Streamlined inlet reduces losses caused by air turbulence, means new high efficiencies.
Sturdy welded fan housings eliminate air leakage, provide rigidity and eliminate vibration.
Fan wheels are of welded construction, with conical backplates for strength, and are statically and dynamically balanced.
Housings are convertible as to direction of discharge in all sizes. Inlet connection rings are in even inch sizes to accommodate standard sheet metal piping.
Extra heavy shafts maintain vibration-free operation. Cooling wheels and oil-lubricated ball bearings are provided for applications at elevated temperatures.
Available for belt or chain drives as well as direct-connected motor drive.
Large, heavy-duty, grease-lubricated ball bearings—one fixed, one floating—offset thrust and reduce maintenance.
Special protective coatings and special metals available to meet hazardous, explosive or corrosive conditions.
Wheels easily removed for cleaning and maintenance. Access doors also available for cleaning and inspection.
11 standard sizes with capacities ranging from 660 to 44,000 cfm and pressures up to 16" water gauge; also 5 additional "made-to-order" larger sizes for special requirements.

CERTIFIED RATINGS

Certified ratings are the result of tests made by the Manufacturers in accordance with the Standard Test Code for Centrifugal, Axial, and Propeller Fans adopted jointly by the National Association of Fan Manufacturers and the American Society of Heating and Ventilating Engineers.

AUTHORIZED BY NAFM

© THE NATIONAL ASSOCIATION OF FAN MFRS.

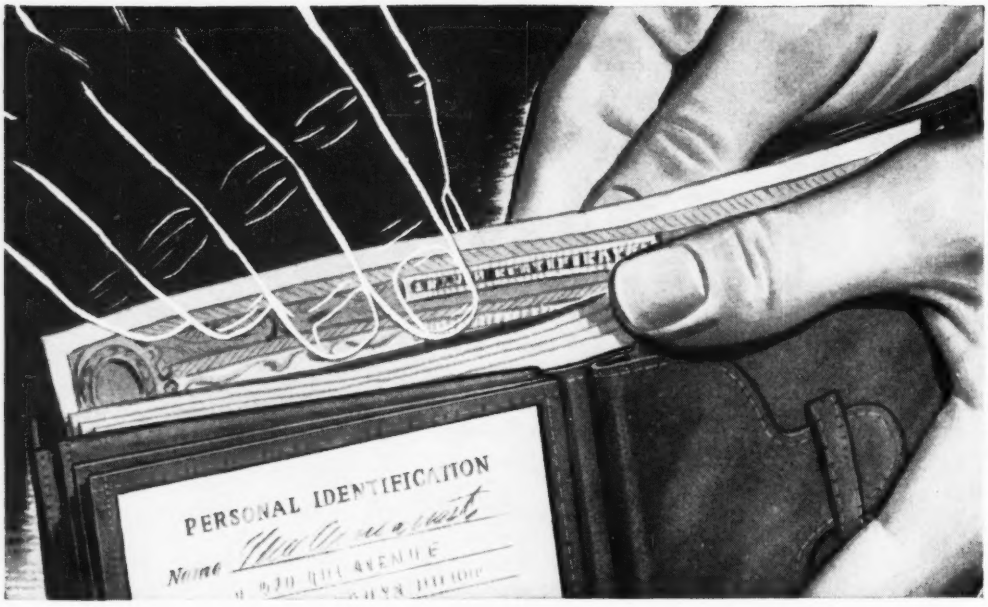
These Fans are certified under the NAFM Standard Test Code and carry the NAFM Certified Ratings Label.

Just off the press, Catalog 1150 gives you 60 pages of complete application information as well as performance and dimension tables for all sizes and wheel types. For your free copy, call your local Westinghouse-Sturtevant Office, or write Westinghouse Electric Corp., Sturtevant Division, Hyde Park, Boston 36, Mass.

YOU CAN BE SURE... IF IT'S Westinghouse

TUNE IN ON HISTORY! Only Westinghouse brings you complete coverage of political campaign over CBS television and radio.

AIR HANDLING



How much is "FLAVOR FADING" costing you?

Put an end to profit-stealing "flavor fading" in your foods by using wonder-working ZEST

Gradual, hard-to-detect "flavor fading" can be robbing you of untold sales and profits every month of the year. Guard against this invisible sales thief as more and more food processors are doing. Add ZEST, Staley's Monosodium Glutamate, to your foods to "lock in" every bit of the natural, fresh flavor of foods as nothing else can! It adds no flavor, no aroma of its own—simply brings out the delicate, natural food flavor *already* present.

As little as 0.05% of ZEST by weight—works flavor magic in vegetables, meats, seafoods, soups, sauces, gravies, chilis and scores of other foods. No formula changes, as easy to use as salt. Just taste *your* foods seasoned with ZEST . . . you'll never be without it! Write today for full details and prices.

STALEY'S PURE MONOSODIUM GLUTAMATE

—guards against food "flavor fading"

A. E. STALEY MFG. CO. **Decatur, Illinois**

More ways to improve your products, lower your costs

Use *Sweetose®* Staley's enzyme-converted corn syrup for more natural color, firmer texture, better appearance in canned, frozen fruits, vegetables.

Use *Sta-Sol®* **Lecithin Concentrate** —Staley's highly refined pure vegetable product, for more natural appearance, better oil dispersion, improved moisture retention.

Use Staley Starches—improved thermophile-free Canner's Starches, for spoilage resistant, better bodied canned soups and vegetables.

STALEY

Staley PRODUCTS

Research Pioneers in Products from CORN and SOY BEANS®

MATHIESON CHEMICAL CORPORATION'S new plant at Doe Run, Kentucky, engineered and constructed by BADGER Process Division, Stone & Webster Engineering Corporation.

...and using the OIC

LONG LINE OF VALVES

OIC builds valves for every purpose—cast and forged steel, iron and bronze—and every valve is *precision-engineered* and *precision-made* to give longer, trouble-free service at no extra cost to you. OIC offers *precision-application* help in selecting valves best suited to each job.

THE OHIO INJECTOR COMPANY
WADSWORTH, OHIO

OIC
FOUNDED 1883

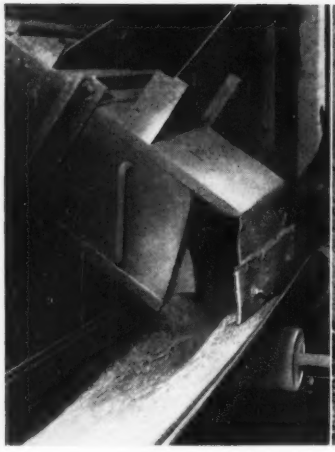
VALVES

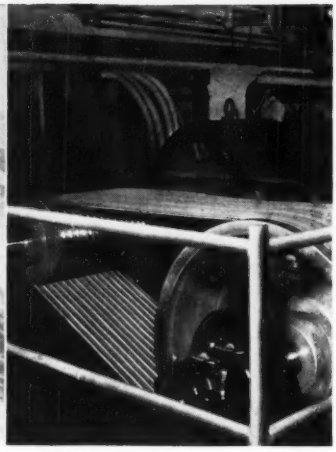
FORGED AND CAST STEEL • IRON • BRONZE

You get that extra margin of endurance with

Thermoid

CONVEYOR BELTS • HOSE • MULTI V-BELTS





Whatever your business, you have applications that involve Conveyor Belts, Hose or V-Belts where these Thermoid products will do your job better—provide that extra margin of endurance that cuts costs.

Constant improvement and expansion of engineering and production facilities have always been part of Thermoid's program for the past 70 years. The results of this continuous program are rubber products that guarantee you high operating efficiency and superior performance . . . meet the demand for maximum service at minimum cost . . . last longer and require less maintenance.

When you have a design, production or operating application involving Conveyor Belts, Hose or Multi V-Belts, call your Thermoid distributor. In most cases, he can select the size and type that will serve your needs most efficiently. Thermoid Sales Engineers are always ready to help you with special problems.

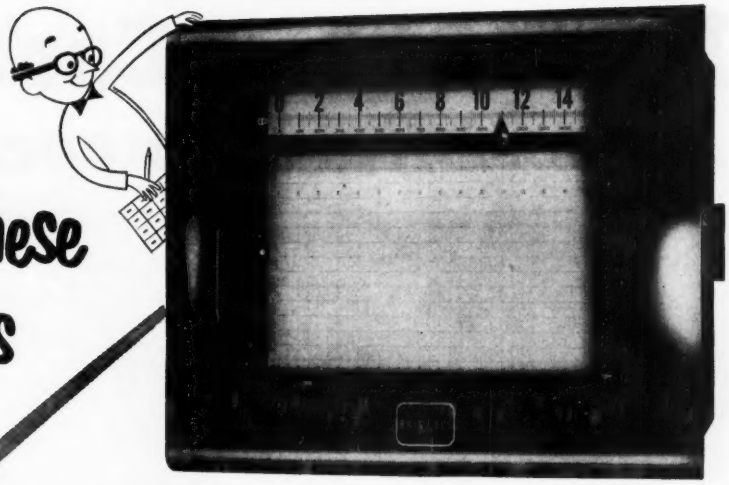
It will pay you to specify Thermoid.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



Check these features

OF THE

BRISTOL DYNAMASTER FOR TEMPERATURE pH and SPEED

—the electronic master-mind for your measuring, recording and controlling problems

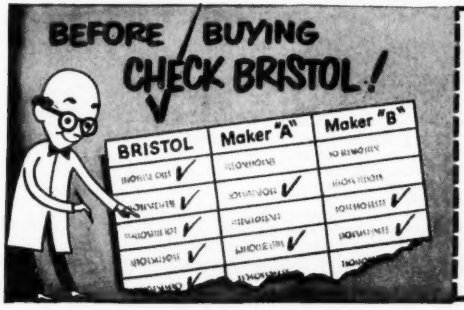
- ✓ Continuous-balancing electronic circuit responds instantly to minute changes
- ✓ All types of electric and air-operated controllers offered
- ✓ Available as a self-balancing bridge or potentiometer
- ✓ Trouble-free operation
- ✓ Electronic component uses vacuum tubes available at any radio supply house
- ✓ Full-scale pen travel in 7, 3 or ⅔ seconds
- ✓ Chart speeds from ¼ in. per hour to 7200 in. per hour
- ✓ Multiple recorders up to 16 points
- ✓ Components interchangeable and easily replaced on all Dynamaster models
- ✓ Immune to most vibration or shock
- ✓ Exceptionally unaffected by stray currents (1000 to 1 discrimination).

BRISTOL

FOR DETAILED PROOF *of the sensitivity, versatility and reliability of the electronic Dynamaster, use the coupon or write for Catalog P1245.*

The dependable Guidepost of Industry

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



THE BRISTOL COMPANY
115 Bristol Road
Waterbury 20, Conn.

Please send catalog giving details of Dynamaster performance to:

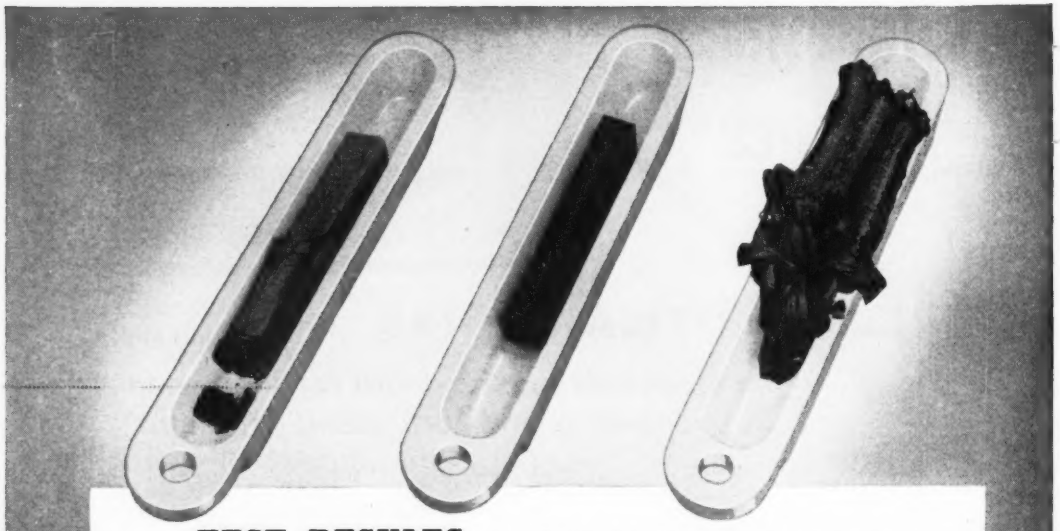
NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

NOW...New Carboloy
for resistance to corrosion,



TEST RESULTS

1 **Oxidation resistance.** (Above, left to right.) Samples of 18-8 stainless steel. Grade 608 Chrome Carbide and tungsten carbide after exposure in air at 1850° F. for 24 hours. All were originally identical in shape and size. Grade 608 Chrome Carbide appears to be virtually completely resistant to oxidation at all temperatures up to 1000°C. (1832°F.). Samples subjected to 1850°F. were only slightly discolored.

2 **Salt spray.** After subjection to a 30% salt spray for 750 hours, Grade 608 still retained its metallic lustre.

3 **Sulphuric acid.** With sulphuric acid as the corrosive agent, Grade 608 showed about 30 times the resistance of 18-8 stainless steel, and 3 times the resistance of tungsten.

4 **Nitric acid.** Using nitric acid, the resistance to corrosion was approximately 8 times that of other carbides and twice that of stainless steel.

5 **Steam erosion.** Tests indicate a resistance to steam erosion approximately 60 times that of conventional carbides.

6 **Lactic or citric acid.** Grade 608 was practically inert under all conditions when exposed to lactic or citric acid.

PROPERTIES OF GRADE 608

The outstanding properties of Grade 608 Cemented Chrome Carbide promise to open new cost-saving applications throughout industry. You may wish to expedite your initial test appraisals by starting with the test kit (above coupon) now pending larger quantities or supplies as production facilities expand.

PHYSICAL PROPERTIES

(Grade 608)

Composition: 83% Cr_3C_2
2% WC
15% Ni

Hardness (Nominal): 88 Rockwell "A"

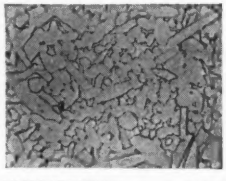
Density (Nominal): 7.0 gms/cm³ (Slightly lighter than S.A.E. 1095 steel)

Transverse Rupture Strength: 100,000 P.S.I.

Coefficient of Thermal Expansion: 6.4×10^{-6} in range of 70°—1292°F.

Relative Abrasive Resistance: Dry Al Oxide—58.0

GAGE ANVILS currently being made of Grade 608 Chrome Carbide. In gage blocks, ring gages, plug gages and gage anvils. Chrome Carbide has already shown an outstanding ability to resist corrosion and abrasion. Since its coefficient of thermal expansion is about the same as that of steel, readings are not affected by temperature variations.



MICROSTRUCTURE of Carboloy Grade 608 Chrome Carbide shows appearance unlike any other metal. Note, particularly, the uniformity and interlocking character of the grain structure. Chrome Carbide is lighter in weight than tungsten carbide; facilitates handling and use of solid carbide. It will pay to start your laboratory tests on Chrome Carbides now.

Chrome Carbide
abrasion, erosion

Grade 608 Carboloy Cemented Chrome Carbide, with chromium as principal ingredient, gives high resistance to corrosion or erosion, combined with good abrasion resistance. Lightweight, nonmagnetic, machineable, stable and strong, Grade 608 opens to you new areas for carbide benefits in industrial and product applications. Sample test quantities now available at nominal cost. Production quantities soon.

NOW, another great Carboloy created-metal makes its bow . . . Carboloy Grade 608 Cemented Chrome Carbide, first in an entirely new series of metallic carbides.

Grade 608 Chrome Carbide contains chromium as the principal ingredient. It is cobalt-free and practically tungsten-free. It features high resistance to corrosion or erosion, combined with good abrasion resistance.

Field tests already point up exciting new areas where Chrome Carbide will bring new cuts in costs, new highs in performance. Undoubtedly, *your* field, *your* product may benefit, too. Send for test kit to start your preliminary metallurgical and chemical test of Grade 608 today.

An expansion of carbides

Grade 608 Chrome Carbide is light in weight, completely nonmagnetic and has a coefficient of thermal expansion about the same as that of steel. It is machineable and as hard as tungsten carbide. It is stable and strong.

Fabricating and finishing techniques are the same as tungsten carbides. A flash plating of nickel makes Chrome Carbide blanks (as sintered or as ground) readily brazable with conventional brazing materials.

Series 600 may overlap a few tungsten carbide applications. But because of their unusual wearproofing properties, their wear- and corrosion-resistance, look to Chrome Carbides for famous carbide benefits to you in many new areas of industrial and product applications. Here may be new opportunities for you, starting with Grade 608.

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
Detroit 32, Michigan

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

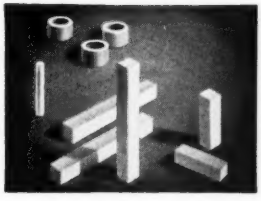
WHERE CAN YOU USE GRADE 608 CHROME CARBIDE?

Field tests indicate new Grade 608 Chrome Carbide offers unusually high resistance to corrosion or erosion combined with good abrasion resistance. For example, the following applications are suggested:

- Sheer blades for molten glass
- Core pins for baking ceramic parts
- Fishing rod guides
- Centrifuge nozzles, separating equipment
- Bearings where corrosives are present
- Textile guides
- Nozzles and valves: soaps, fats, oils, foods, chemicals, petroleum products, pharmaceuticals, fruit juices
- Valve and core pins, die casting
- Punches for movie film
- For many applications where stainless steel is not sufficiently abrasion-resistant

Where else can you use Grade 608 Chrome Carbide?

9-piece Test Kit $10.75



INCLUDES: Three bars ¼" square x 2"; two bars ¼" square x 1"; three bushings 5/16" long, ½" O.D., 5/16" I.D.; one rod ⅛" diameter x 1" long. (Bulletin WR-104 included.) Samples adequate for wide range of tests. Information relative to your particular application free, on request from Carboloy engineers. Send coupon below today for test kit.

CARBOLOY Department of General Electric Company
11201 East 8 Mile Ave., Detroit 32, Michigan

Please send free copy of Technical Bulletin WR-104 only.

Please send ( ) test kits of Grade 608 Carboloy Cemented Chrome Carbide at $10.75 each. Technical Bulletin included.

Enclosed is ☐ Check ☐ Money Order ☐ Purchase Order for $_____
☐ Please invoice us.

Send to _____ Title _____

Name of Company _____

Address _____ City & Zone _____ State _____

For more information, use post card on last page.

JUST THE THING

TO MAKE A

SALAD SING!

Battery of Pneumatic labelers in operation at plant in Bayonne, N. J. One of several locations where Pneumatic labeling and capping equipment has been installed for The BEST FOODS, Inc.

another popularity winner bottled by PNEUMATIC

No doubt about it — The BEST FOODS people know how to make a mayonnaise to tempt the popular taste. HELLMANN'S is their name for it, as millions of women will tell you.

The BEST FOODS, Inc., know more than a little about the best methods of bottling their famed product, too. From long, first hand experience they've learned you can do a neater, smoother job of capping and labeling, at a "lower cost per container", by using Pneumatic equipment.

There are so many, many other concerns of similar character and high standing who share the same opinion about Pneumatic machines that it is important for you to know just why they feel that way. We'll be glad to fill in the details for you.

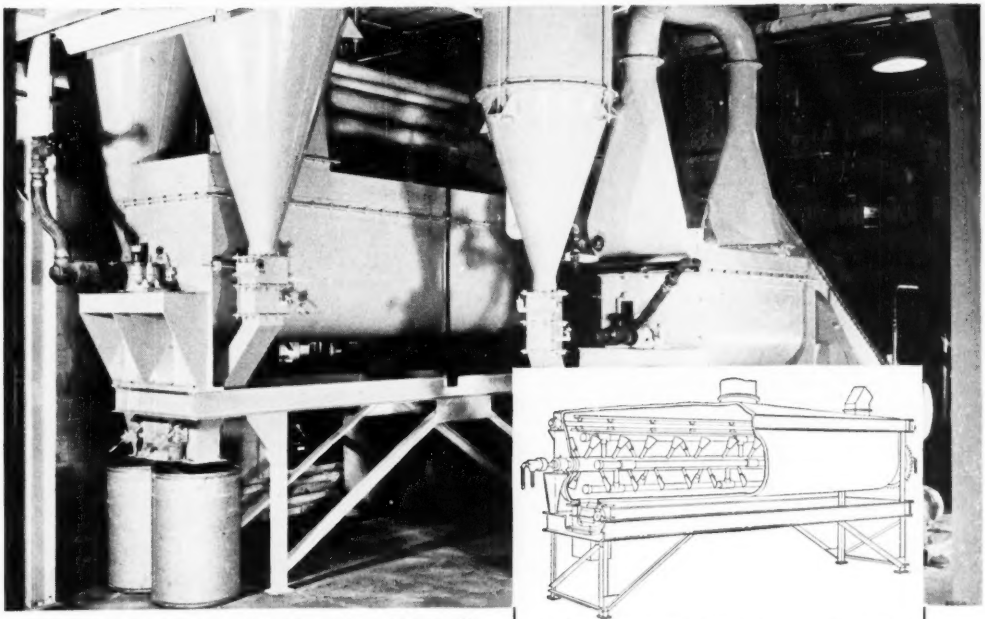
PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Mass.
Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.

PNEUMATIC

PACKAGING AND BOTTLING MACHINERY

NOW--get economical drying · cooling · solvent recovery with LINK-BELT's new, low-cost

MONOTUBE DRYER



Here is a two-unit Monotube installation that paid for itself in six months. The pharmaceutical manufacturer recovers solvents which were formerly lost.

Paddle conveyor on hollow shaft turns in U-shaped trough. Steam, hot liquid or coolant circulates through shaft and outrigger tubes, producing efficient transfer of heat as material is churned and conveyed through trough.

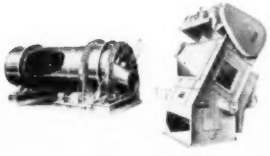
PROCESSORS of chemicals, pharmaceuticals, food, vegetable oils and other materials report attractive savings using the Link-Belt Monotube Dryer. This compact unit utilizes only one moving part . . . provides constant agitation of material to assure uniform, efficient drying without overheating.

In addition, the Monotube Dryer practically eliminates dusting—there are no air currents through the material bed. More—it's extremely flexible . . . operates equally well at high or low temperatures.

If your production requires drying, cooling or solvent recovery, send a sample of your material—a pound or a ton—to Link-Belt. We'll analyze it . . . work out procedures in our laboratory that can be duplicated in your plant. Link-Belt can specify the correct type and size of dryer for your exact need—either the new Monotube or one of the other types of Link-Belt dryers. Call the Link-Belt office nearest you . . . or write for new Link-Belt Book 2413.

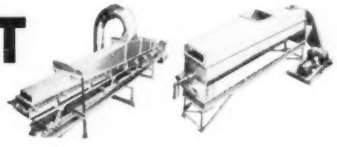
LINK-BELT COMPANY: Plants—Chicago, Indianapolis, Philadelphia, Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities.

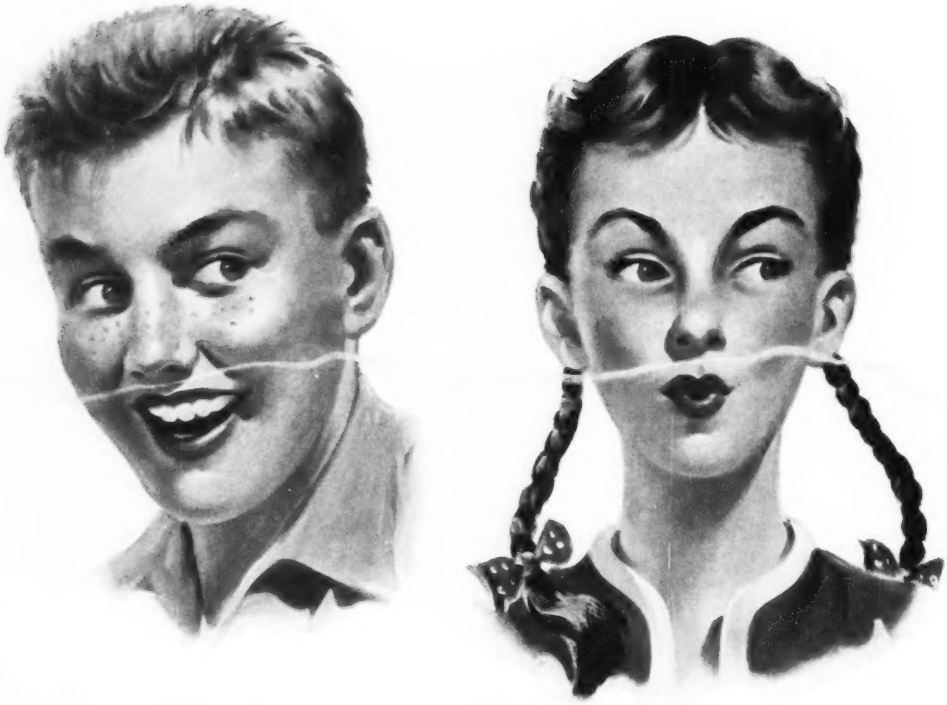
12,974



LINK-BELT

DRYERS · COOLERS
ROASTERS





GAIN MORE CUSTOMERS...

ADD VICTOR PHOSPHATES FOR

Many cereals, flour, prepared mixes, food beverages, and other foods are being enriched with essential calcium, phosphorus, and iron by the addition of Victor phosphates. Victor Calcium Phosphates are recognized as an excellent source for both calcium and phosphorus. Victor Hi Calcium Phosphate is widely used to provide calcium enrichment in flour. Victor Sodium Iron Pyrophosphate was specially developed for iron enrichment of those foods where the possibility of rancidity development must be avoided. Victor Ferric Phosphates are used for iron enrichment when no rancidity potential exists.

Victor is recognized as a leading producer of phosphates for foods. This fact is especially important to you and your mineral enrichment program. Today, food manufacturers agree that Victor phosphates help them gain new customers and establish preference for their brands. Mineral enrichment of your product can be accomplished without altering its characteristics or flavor.

Do You Have an Enrichment Problem?

You will find that Victor phosphates can be added to your products easily and at low cost. Remember, Victor has specialized in food phosphates for over 54 years. You can profit from

MINERAL ENRICHMENT

this experience. Contact Victor. We will be pleased to work with you. Write today. Victor Chemical Works, 141 W. Jackson Blvd., Chicago 4, Ill. In the West: A. R. Maas Division, 4570 Ardine St., South Gate, Calif.

VICTOR

Dependable Name in Chemicals

for 54 Years

VICTOR PHOSPHATES FOR ENRICHMENT

PRODUCT—MONOCALCIUM PHOSPHATE

Anhydrous—$CaH_4(PO_4)_2$ (heat-treated)
Monocalcium phosphate, anhydrous (heat-treated)
Calcium acid phosphate, anhydrous (heat-treated)
Calcium biphosphate, anhydrous (heat-treated)

TRADE MARK—V-90 ®

(U. S. Patents 2160700 and 2160232; Canadian Patents 388809 and 388810)

USES—When used as a leavening agent in preleavened mixes, it automatically introduces substantial quantities of nutritionally available calcium

DESCRIPTION—V-90 is a fine granulated, white, free-flowing powder, each particle of which has a thin, continuous coating of a relatively insoluble phosphate which delays solution when aqueous liquids are added

Typical analysis: Phosphorus.....25.7%
Calcium.....17.7%

PRODUCT—HI CALCIUM PHOSPHATE

USES—Manufacture of phosphated and calcium enriched flours

DESCRIPTION—Hi Calcium phosphate is a special, crystalline monocalcium phosphate with a high calcium content

Typical analysis: Phosphorus.....22.6%
Calcium.....22.4%

PRODUCT—DICALCIUM PHOSPHATE, U.S.P.

Hydrated—$CaHPO_4 \cdot 2H_2O$

NOMENCLATURE—Dicalcium phosphate, dyhydrate; Calcium phosphate, dibasic

USES—Mineral supplement in cereals, foods, and pharmaceuticals

DESCRIPTION—Dicalcium phosphate is a tasteless, white, crystalline material, and complies in purity with all Food and Drug Laws and specifications of U.S. Pharmacopoeia XIV

Typical Analysis: Phosphorus.....18.0%
Calcium.....23.6%
pH (50% suspension).....6.8—7.6
Sieving: Substantially all through 300 mesh

PRODUCT—DICALCIUM PHOSPHATE

Anhydrous—$CaHPO_4$

NOMENCLATURE—Dicalcium phosphate, anhydrous; Calcium phosphate, dibasic anhydrous

USES—Mineral supplement in cereals, foods, and pharmaceuticals

DESCRIPTION—Dicalcium phosphate, anhydrous, is a white, tasteless, finely-powdered material which complies with Food and Drug Laws in purity

Typical Analysis: Phosphorus.....22.3%
Calcium.....29.0%
pH (50% suspension).....6.8—7.5
Sieving: Substantially all through 300 mesh

PRODUCT—TRICALCIUM PHOSPHATE, N.F.

$3Ca_3(PO_4)_2 \cdot Ca(OH)_2$

NOMENCLATURE—Tricalcium phosphate, Precipitated calcium phosphate, Calcium phosphate, tribasic, Tricalcium hydroxy-phosphate

USES—Mineral fortification of foods, and pharmaceutical applications

DESCRIPTION—Tricalcium phosphate is a white, crystalline, tasteless solid, which complies with all Federal and State Food Laws, and also with National Formulary IX specifications

Typical analysis: Phosphorus.....17.3%
Calcium.....36.7%
pH (20% suspension).....6.5—7.2
Sieving: Substantially all through 200 mesh

PRODUCT—SODIUM IRON PYROPHOSPHATE

$Na_2Fe_2(P_2O_7)_2 \cdot 6H_2O$

USES—Iron enrichment of flour, cereals (U.S. Pat. 2357069), milk amplifiers, and food beverages. Pet food enrichment.

DESCRIPTION—Sodium iron pyrophosphate is a light tan powder. It meets Federal and State Food Laws in purity
Granulation: Substantially all through 300 mesh

Typical analysis: Iron (min.).....14.5%
Phosphorus.....21.6%

PRODUCT—FERRIC ORTHOPHOSPHATE

$FePO_4 \cdot XH_2O$

NOMENCLATURE—Ferric orthophosphate, Iron phosphate, insoluble

USES—Iron enrichment in pharmaceuticals vitamin tablets. A nutritionally available form of iron that can be used in pharmaceuticals and foods not subject to rancidity

DESCRIPTION—Ferric orthophosphate is a light tan powder and is of food grade purity. Insoluble in water, but soluble in dilute acids
Granulation: Substantially all through 300 mesh

Typical analysis: Iron.....27.0%
Phosphorus.....15.8%

PRODUCT—FERRIC PYROPHOSPHATE

$Fe_4(P_2O_7)_3 \cdot XH_2O$

NOMENCLATURE—Ferric pyrophosphate, Iron pyrophosphate, insoluble

USES—Manufacture of rice enrichment. A nutritionally available form of iron that can be used in pharmaceuticals and foods not subject to rancidity

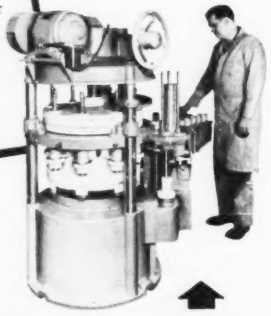
DESCRIPTION—Ferric pyrophosphate is a light tan powder of food grade purity. Insoluble in water, but soluble in dilute acids
Granulation: Substantially all through 300 mesh

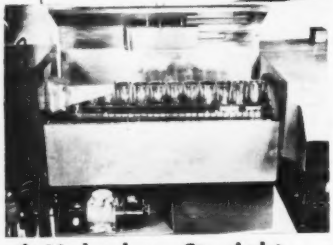
Typical analysis: Iron.....25.0%
Phosphorus.....20.8%

Talk to a BARNES Process Engineer

when you want to lower Food Packing Costs

Here are three of many Barnes' installations that have proven profitable to food packers. As with other Barnes equipment, these represent the results of our work in collaboration with food packers on specific problems. If you have similar or other problems in your plant for which you haven't found equipment or, where available equipment is inadequate, call in a Barnes' process engineer. He may come up with the solution.



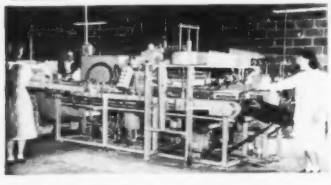


Valveless Straight Line Filler

This model 60 valveless straight line filler is one of the units used in the successful Martin Aseptic Canning System. It consists of a rectangular enclosure through which the cans are conveyed continuously in a straight line beneath a slit-type filling nozzle.

New, Fast, Efficient Double Seamer

This new closing machine features simplicity of adjustment, fast operation and identical seams. Moderate spindle speeds eliminate "bounce" over side seams and insure positive sealing. Write for additional data.



Unload 7 Cases Per Minute

This packer, faced with the problem of uncasing jars from cartons containing 36 jars for repacking into cases of 12, uses the above equipment to unload more than 7 cases per minute. Savings in labor and time are exceptional. If you have a similar problem we would be glad to furnish the packer's name upon request.

FREE ADDITIONAL DATA on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for Bulletin E-752.

W. F. & JOHN BARNES

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 326 SOUTH WATER STREET, ROCKFORD, ILLINOIS

(ADVERTISEMENT)

Up to the Minute News On Aseptic Canning

Many canners are investigating the possibilities of putting up their products with the Martin Aseptic Canning System. Milk and milk products such as chocolate milk can be canned successfully with this new process. Vegetables and fruit products and juices are being canned commercially. The first product canned in this category was the famous Andersen's Split Pea Soup. This soup is being canned without losing flavor or color of the homemade style soup.

3 Large Dairies Install Pilot Lines for Canning Fresh Whole Milk

One of the most amazing results of this new process is canned whole fresh milk. Imagine what this means to milk starved areas such as Alaska alone. Also, think of the simplicity of distribution as compared with present day methods. Two large dairies are now canning fresh milk commercially and three more have installed pilot lines for milk and other milk products.

Banana Puree Soon To Be Available in Cans

Bananas have high nutritive value, they also are highly perishable. But, soon, the housewife and mother will be able to obtain banana puree for infant feeding and baking—out of cans. This, again, is a revolutionary canning job made possible and simplified with the Martin Aseptic Canning System. We at W. F. and John Barnes, as sales agents for this process, are glad to be able to bring it to the food packer. Call in a Barnes technician for further discussion. There is no obligation for this service. Write W. F. and John Barnes Company, Process Equipment Division, 301 South Water Street, Rockford, Illinois.

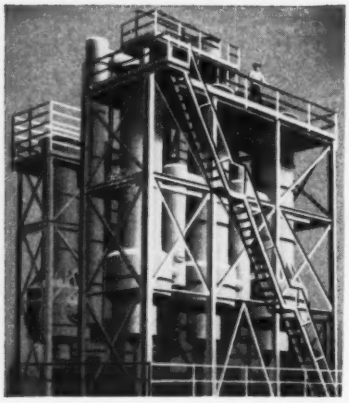
by FIRMENICH

gives finer flavor . . . greater sales appeal . . . to your products

You get the direct and authentic reproduction of raspberries in their full perfection in Raspberry Flavor by Firmenich. For Firmenich took fully ripe raspberries, freshly severed from the stem, captured their delicate and fugitive flavor, and by original research reconstructed it in all its significant and desirable components. Firmenich Raspberry comes to you as a precise and potent flavor material of the utmost purity and stability to enhance the flavor of your products and to make them more attractive to your customers.

250 WEST 18th STREET, NEW YORK 11, N. Y.

CHICAGO OFFICE: 612 NORTH MICHIGAN AVE.
FIRMENICH OF CANADA, LIMITED, 348 WALLACE AVE. • TORONTO
GENEVA • PARIS • LONDON



How do you put a lot of Hawaii into a six-ounce can?

The Dole Hawaiian Pineapple Company does it with a Carrier Concentrator.

Hawaiian pineapple juice had never been successfully concentrated before. The process is a very special one, with special problems. But it was the kind of assignment Carrier welcomed. Working closely with Dole, Carrier developed a high vacuum, low temperature Concentrator which went into operation this spring in Honolulu and for the first time successfully concentrated Hawaiian pineapple juice.

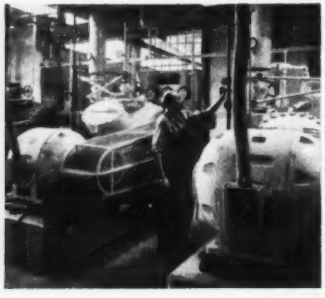
This unique continuous-flow Carrier Concentrator evaporates nearly 11,000 pounds of water an hour from the juice and helps turn out 200 six-ounce cans of frozen, blended pineapple concentrate each minute. That's more than 200,000 cans each 18-hour processing day!

Like other Carrier Concentrators designed for such name brands as Minute Maid, Snow Crop and Sunkist, this new three-effect unit evaporates water at relatively low temperatures so all the flavor of fresh juice is preserved. For Dole's Honolulu installation, Carrier added an essence recovery unit which captures the exact taste and smell of fresh juice and blends them back into the finished concentrate.

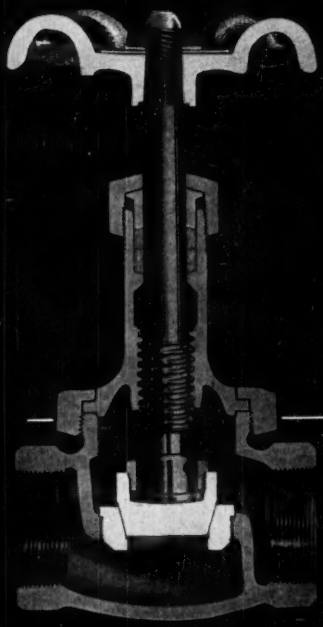
Have *you* a concentrate problem? You may be a long way from Honolulu, and your product a lot different from pineapple juice. No matter where you are or what you're processing, *your* problems are special, too. We'd like to work with you. Why not drop us a line? Carrier Corporation, Syracuse, New York.

Carrier

AIR CONDITIONING
REFRIGERATION
INDUSTRIAL EQUIPMENT



Here at the Dole installation are 2 of the 5 Carrier Ammonia Compressors which develop a total of 352 tons of refrigeration at suction temperatures ranging from plus 40° to minus 47° F; and (right) a battery of Carrier Cold Diffusers which keep warehouse temperatures at minus 10° F.



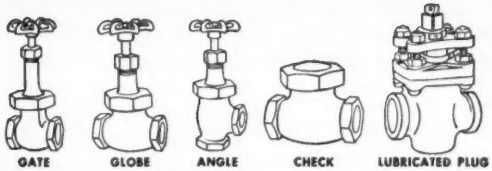
BRONZE

COMPLETE LINES OF BRONZE VALVES AND PIPE FITTINGS are manufactured by Walworth in a variety of types, pressure ratings, sizes, and patterns, including Walseal® Bronze Valves and Fittings for making Silbraz® joints.

Walworth also manufactures complete lines of valves and fittings – including Lubricated Plug Valves – made of steel, iron, and special alloys as well as bronze.

Walworth-made valves, pipe fittings, and pipe wrenches, total approximately 50,000 items—all sold through distributors in principal centers throughout the world.

Walworth engineers will be glad to help you with your problems. For full information call your local Walworth distributor, nearest Walworth sales office, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



Bronze valves in gate, globe, angle, check, and lubricated plug types are manufactured by Walworth. Illustrated is a sectional view of a Walworth No. 225P Bronze Globe Valve. This valve has a working steam pressure rating of 350 psi at 550F (1,000 psi non-shock cold water, oil, and gas pressure). It features a renewable, plug type, stainless steel seat and disc, heat treated to 500 Brinell hardness.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

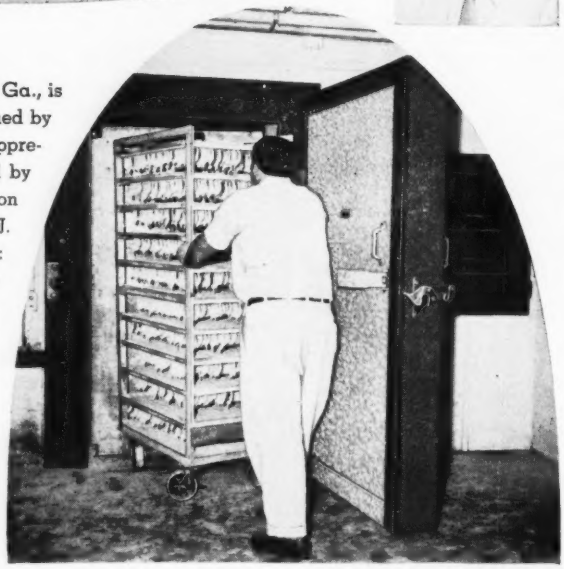
60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

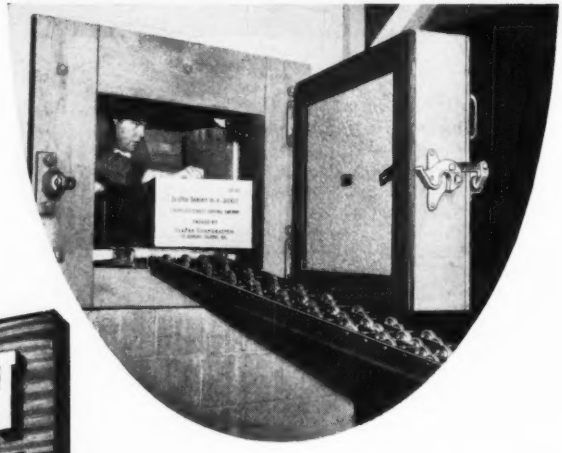
"JAMISON doors were recommended by our engineers. They have proved worthy of the recommendation by their efficiency."

J. ROY DUGGAN, General Manager, SeaPak Corp.

The SeaPak Corporation of St. Simon's Island, Ga., is famous for its packaged shrimp—a fame earned by its advanced processing methods and a keen appreciation that freshness can only be maintained by efficient refrigeration. When asked why Jamison Cold Storage Doors were chosen for his plant, J. Roy Duggan, General Manager of SeaPak, said: *"They were recommended by our engineers and have proved worthy of the recommendation by their efficiency."* For full information on Jamison doors request Catalog, Sec. 1, Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.



SUPER FREEZER DOOR provides a tight seal for this 60° below flash freezing room. Vestibule Door helps save refrigeration during movement of material.



REACH-IN SUPER FREEZER DOOR SPEEDS HANDLING by use of conveyors. Small door size plus self-closing inside batten doors keep refrigeration losses to a minimum when storing or removing cartons.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

The Leader For Over 50 Years

Sterilizes highly viscous materials

Even highly viscous, or heat-sensitive materials, which cannot be sterilized by any other method, are processed efficiently with VOTATOR* Heat-transfer Apparatus.

This equipment heats the product to temperatures of 280-290°F, holds at the elevated temperature, then cools to a pre-determined level . . . *in a matter of seconds.* The speed and accuracy of reaching sterilizing temperatures avoids damage to sensitive products.

The complete process is under precise mechanical control, in a continuous, closed system. Thus product handling, waste, and labor requirements are drastically reduced.

You can call on Girdler for complete process design, engineering, and erection service, as well as for efficient food processing equipment. Write The Girdler Corporation, Votator Division, Louisville 1, Kentucky. District Offices: San Francisco, Chicago, Atlanta, New York.

WIDE APPLICATION

FOOD PRODUCTS	FUNCTION OF VOTATOR APPARATUS
Cream Style Corn	Sterilizing and Cooling
Dog Food	Cooking, Sterilizing and Cooling
Chocolate Milk Drink	Sterilizing and Cooling
Edible Starch (For Salad Dressing)	Cooking and Cooling
Pie Filling	Cooking, Pasteurizing and Cooling
Strained Food	Sterilizing and Cooling
Soup	Sterilizing and Cooling
Lard	Chilling and Plasticizing
Margarine	Continuous Manufacture
Shortening	Chilling and Plasticizing
Sweetened Condensed Milk	Cooling and Crystallizing Sugars
Invert Syrup	Cooling and Crystallizing of Sugars
Eggs	Pasteurizing and/or Chilling
Concentrates, Fruit Juices and Purees	Slush-Freezing
Juice Concentrates	Enzyme Inactivation, Sterilization, Cooling

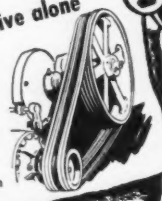
*VOTATOR—Trade Mark Reg. U.S. Pat. Off.

the **GIRDLER** Corporation
VOTATOR DIVISION

What do you do when your v-belts get loose or break?

1 Leave the drive alone

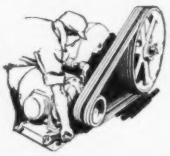
You get more slippage
...wasted power
...excessive belt wear
...uneven sheave wear
...less production



2 Slide the motor back

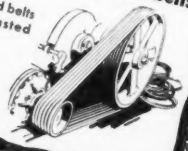
Tight belts get too tight

Life of belts and bearings is reduced



3 Install a new set of belts

Discarded belts mean wasted money



4 Use VEELOS...

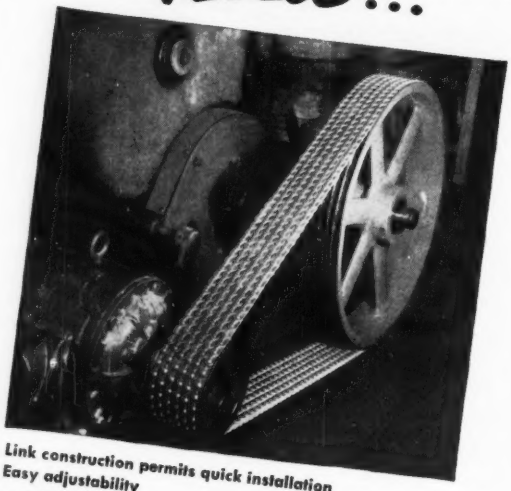
Only with VEELOS...

the adjustable v-belt—can you get *all* these operating advantages. And *only* with Veelos can you eliminate costly v-belt inventory because just four reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts.

VEELOS DATA BOOK...

The plain facts on construction, installation and use of Veelos are included in this illustrated Data Book —write for your copy.

MANHEIM MANUFACTURING & BELTING COMPANY
605 Manbel St., Manheim, Pa.



Link construction permits quick installation
Easy adjustability
...provides controlled tension on each belt
...eliminates loafers
Keeps your machines running for *profitable* production

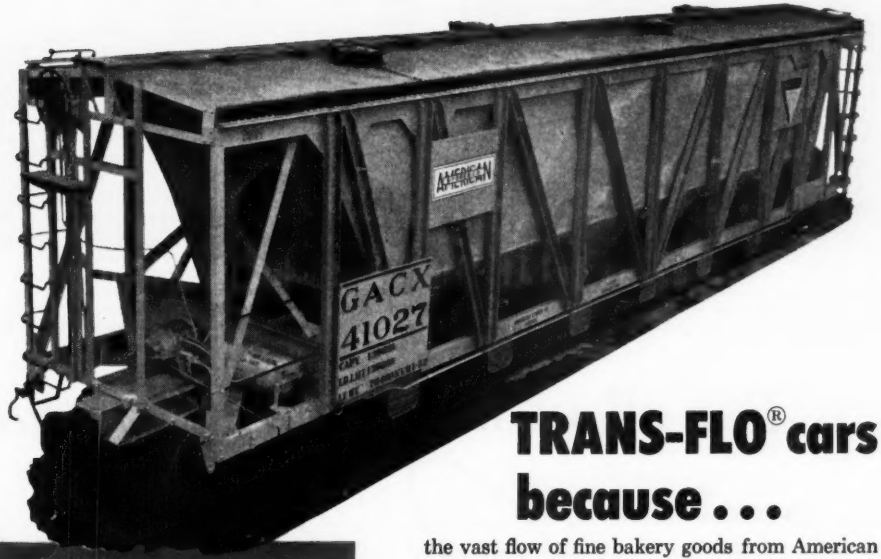
VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

The American Stores Company

new bakery in Philadelphia uses the most modern equipment for *efficiency* and the finest, proven safeguards for *sanitation* including

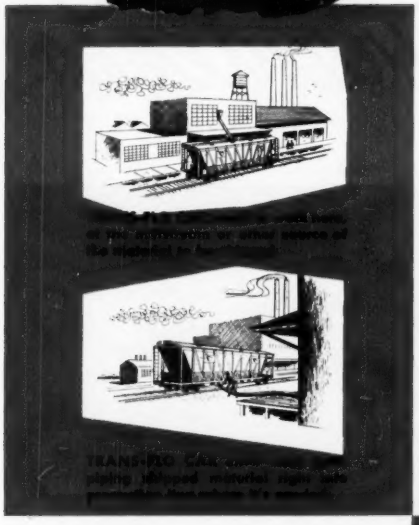


TRANS-FLO® cars because . . .

the vast flow of fine bakery goods from American Stores' ovens calls for a constant supply of flour to be transported from the mill, safely, quickly and with utmost sanitation. To do this job best, American Stores selected TRANS-FLO cars, because—

A TRANS-FLO car and *only* a TRANS-FLO car . . .

- *can carry 115,000 lb. of milled flour from mill-stream to bakery in one load . . .*
- *can be unloaded in 4-man-hours or less.*
- *saves time, lowers costs, speeds production, while preventing contamination and minimizing shrinkage.*

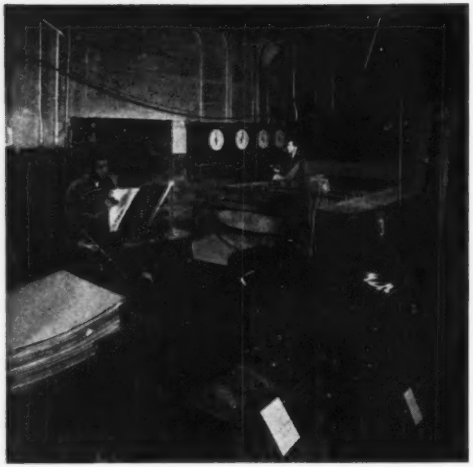


MEMO- If your "on-line" bakery uses 5,000,000 lb. or more flour annually, then TRANS-FLO cars can make and save money for you.

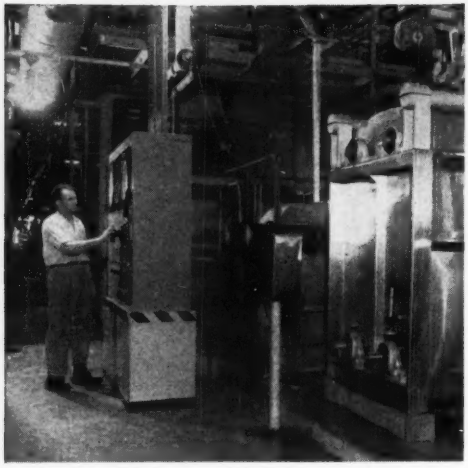
We will be glad to make detailed, comparative analysis for your operation between your present methods and TRANS-FLO.

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street, Chicago 90, Illinois
Offices in all principal cities

TRANS-FLO GENERAL AMERICAN



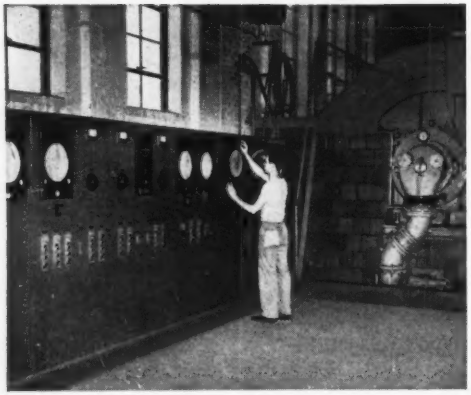
HOT DIP *tin house in large eastern steel mill uses* ***ElectroniK*** *instruments to control metal and palm oil temperatures . . . in adjacent departments, the same instruments control huge electrolytic tin lines, insuring quality tinplate and minimum use of the strategic metal.*



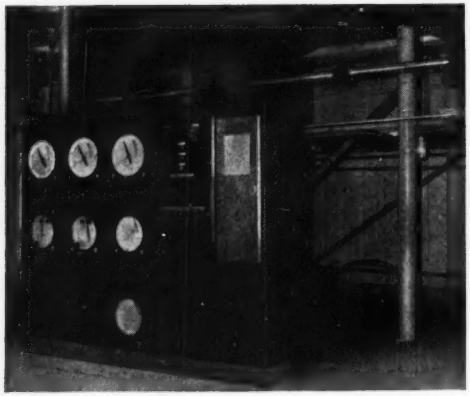
COORDINATION *of speeds, temperatures, pressures, flows and other variables . . . through modern instrumentation . . . makes possible the stabilization of continuous textile bleaching, and results in greater overall production in such a modern installation as this.*

For all of industry . . . *especially*

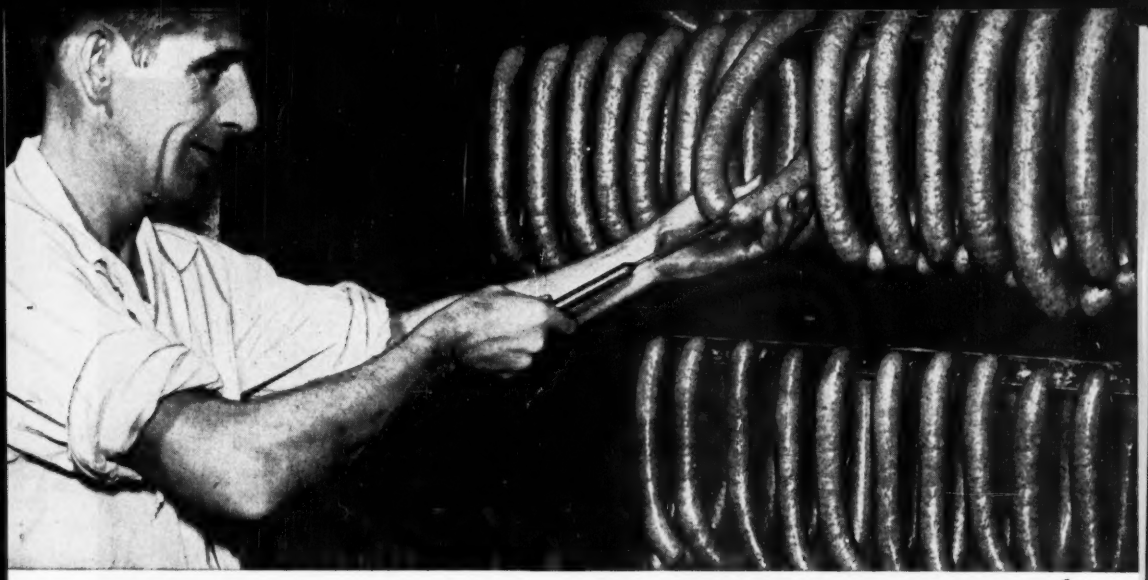
Instruments



ONE MAN BLEACH PLANT, *with the best equipment and controls, produces 130 tons of bleached pulp per day. The plant runs so smoothly that the operator also has time to make hourly tests on bleach liquor and bleached pulp.*



CITRUS CONCENTRATORS *at Pasco Packing Company plant turn out 1250 gallons of high quality concentrate per hour. One man supervises operations . . . aided by Honeywell automatic control system which regulates raw juice flow, heat input, and density of finished product.*



MEAT PACKERS *are boosting smokehouse output as much as 15% by measuring internal temperatures of meat products. A special thermocouple, used with an* **ElectroniK** *recorder, eliminates guesswork in judging completeness of cooking . . . saves labor, steam and fuel, and improves quality.*

for the food industry

speed production

A LOT of changes are being made in food plant engineering . . . and a lot of production-minded processors are turning to a new concept of control technology as a basic tool for the practical application of revolutionary process techniques.

Increased demands for more and more of the new food products will place greater emphasis upon the need for stepped-up production without compromise on quality or cost. And, modern instruments and controls are ready to handle an increasing share of the load.

Brown instruments and controls have earned the respect of progressive food plants . . . have become identified with such important new processes as aseptic canning, citrus juice concentration, and the packaging of fresh whole milk. Even now, more new developments are in the offing, incorporating newer techniques and newer controls.

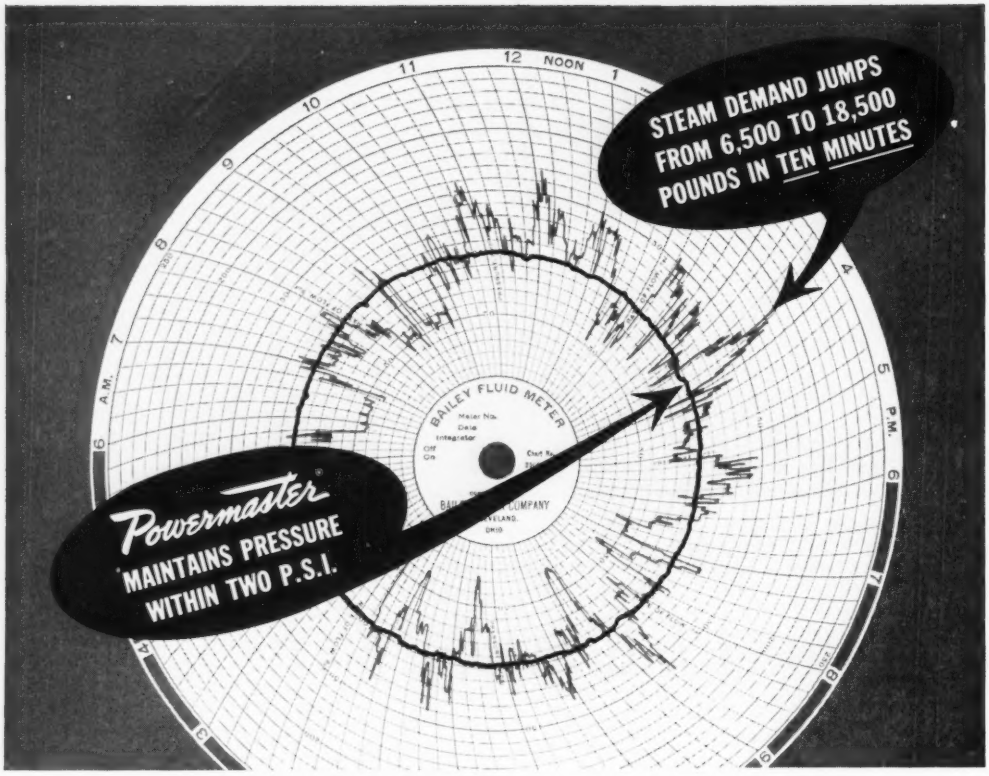
Our local engineering representative will welcome the opportunity to discuss your instrument requirements . . . to speed production or accelerate research. Call him in today, he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

● *Important Reference Data*

Write for a copy of new brochure, "Tomorrow Is Today"... for a brief description of the manifold contributions of instruments.


STEAM DEMAND JUMPS FROM 6,500 TO 18,500 POUNDS IN TEN MINUTES
Powermaster MAINTAINS PRESSURE WITHIN TWO P.S.I.
BAILEY FLUID METER
12 NOON
A.M.
P.M.

Performance records prove *Powermaster's* VORIFLOW combustion responds immediately to steam demand . . . and at full efficiency

At a large southern cotton mill, two 300 h.p. POWERMASTER boilers are generating steam 'round-the-clock at a constant pressure of 100 p.s.i. Note how evenly this pressure (blue line on chart) was maintained even though steam demand (red line) varied from a low of 3,000 pounds per hour to a high of more than 18,500. Between 3:30 P.M. and 3:40 P.M. the load nearly tripled . . . but the POWERMASTERS responded immediately with insignificant pressure change and no "hunting".

This kind of performance is possible because of POWERMASTER's exclusive VORIFLOW combustion. Here's what it will do for you:

1. Saves fuel by providing infinitely variable combustion modulation in response to demand—with *full efficiency*—through wide range from 30% to 100% of firing capacity.

This means elimination of waste and maintenance headaches because of incomplete combustion. The VORIFLOW air-atomizing oil burner does away with outmoded mechanical spinning devices, globules of wasted oil, and gummy cleaning problems. The VORIFLOW gas burner is an O&S pre-mix design equally efficient at all firing rates between 30% and 100% loads.

2. Slashes boiler maintenance costs.

The burner has *no* moving parts to wear out • There is *no* cup to clean daily • Routine cleaning of the burner once a month is sufficient • There is *no* burner vibration to throw adjustments "out of whack" • Parts are made of stainless steel, brass, and beryllium copper—they will last indefinitely.

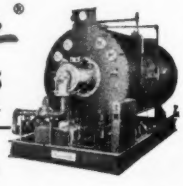
3. The combination burner permits rapid change-over from one fuel to another—light oil, heavy oil, or gas.

Before deciding on a boiler for your plant, be sure to get the facts on the newest POWERMASTER with VORIFLOW combustion. Write for this catalog that gives you the entire story of the *Powermaster* packaged automatic boiler. Just drop us a line and we'll put one in the mail for you.

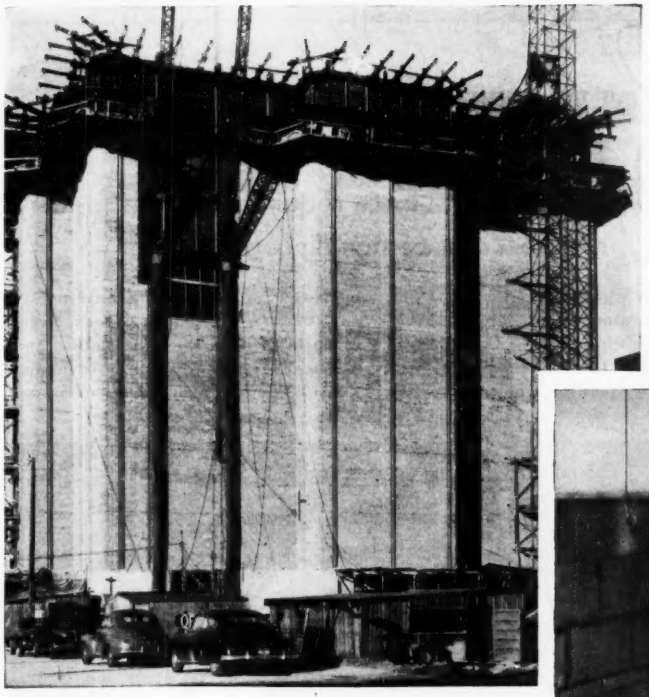
Powermaster®

PACKAGED AUTOMATIC BOILERS

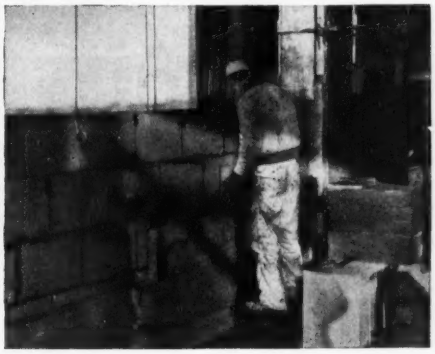
In sizes to 500 HP; pressures to 250 psi.



ORR & SEMBOWER, INC. • Established 1885 • **940 Morgantown Road, Reading, Pennsylvania**



New stockhouse of the Miller Brewing Company, Milwaukee, Wisconsin, is the world's largest, with a capacity of 260,000 barrels. On walls and roof, FOAMGLAS helps maintain the required interior temperature of 28°F. Large photo shows exterior masonry wall being laid up against FOAMGLAS. The small photo shows the big light weight blocks of FOAMGLAS built up as a free-standing, self-supporting wall of insulation. Architect: Gregory G. Lefebrve, Milwaukee, Wis. Professional Engineer: Donald C. Wiggins of Lefebrve and Wiggins, Milwaukee, Wis. General Contractor: Walter W. Oeflein, Inc., Milwaukee, Wis. Insulation Contractor: Sprinkmann Sons Construction Co., Milwaukee, Wis.



Time meant money–so they saved a year

Miller Brewing Co. needed an enclosed, well insulated building, to maintain low temperatures. And they needed it right now. By erecting free standing walls of moisture-resistant FOAMGLAS on the steel frame, the building was ready for operation nine to twelve months ahead of schedule, before exterior masonry was completed.

FOAMGLAS is cellular in structure, hence a highly effective insulation. It is made of glass, which repels many destructive elements, so FOAMGLAS gives "good as new" service for years on end without costly maintenance.

In walls, on roofs and under floors of all sorts of structures, FOAMGLAS has proved the ideal aid for maintaining low temperatures. It is also available in standard sizes for piping, in fabricated valve and fitting covers and in special shapes for process equipment.

Whenever you face the need for insulation be sure that you have the latest data on FOAMGLAS. We shall be glad to send you a sample of the material and copies of our latest booklets. Just drop the coupon in the mail today.

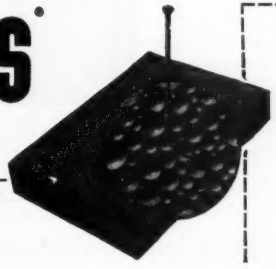
PITTSBURGH CORNING CORPORATION • PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

FOAMGLAS®

the cellular glass insulation

The *best* glass insulation is cellular glass. The only cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, verminproof. It has unusually high resistance to moisture, chemicals and many other elements that cause insulation to deteriorate.



Pittsburgh Corning Corporation
Dept. NN-102, 307 Fourth Avenue
Pittsburgh 22, Pa.

Please send me, without obligation, a sample of FOAMGLAS and your FREE booklets on the use of FOAMGLAS for: Refrigerated Structures ☐ Piping and Process Equipment ☐.

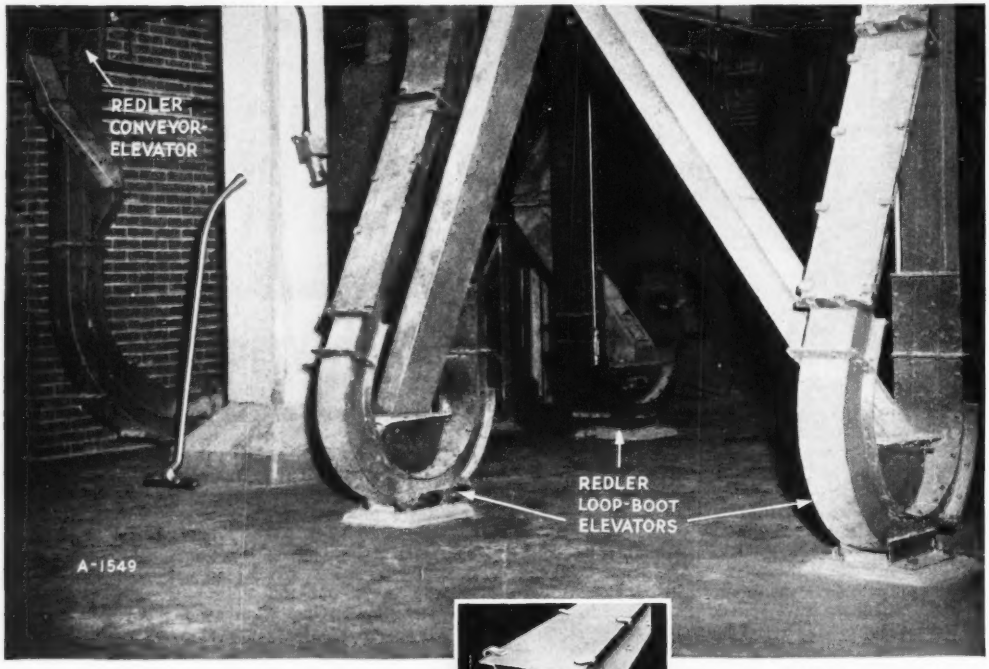
Name.....

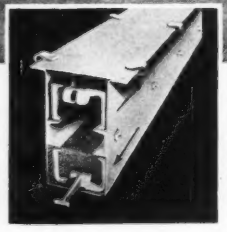
Address.....

City.....State.....

S-A CONVEYING *Systems* cut **SPACE** requirements, reduce **COST** of handling grains

A space-saving, dust-tight REDLER conveyor-elevator system, similar to the units shown below, may be the low-cost answer to your bulk handling problems. Or, you may require a belt conveyor, bucket elevator or vibrating conveyor layout. Whatever the need, S-A engineers can help you find the right method and the right equipment. Write us for further information . . . no obligation, of course.





A network of 26 REDLER Conveyors and elevators, plus several screw conveyor units, moves whole grain and meal through storage and milling at this plant. Compact REDLER equipment cuts materials handling space requirements to minimum. Only a little more than one square foot of floor space is required for self-supporting REDLER elevator casing as it passes from floor to floor. Dust-tight, sealed REDLER casings keep dust confined within the conveyors and elevators and prevents the escape and spread of potentially explosive mixture.

Belt Conveyors	Vibrating Screens
Vibrating Conveyors	Bin Gates, All Types
REDLER Conveyor-Elevators	Box Car Loaders & Unloaders
ZIPPER Conveyor-Elevators	Circular Bin Dischargers
Screw Conveyors	Centrifugal Loaders & Pilers
Bucket Elevators	TELLEVEL Bin Level Controls
Pan Conveyors	SEALMASTER Ball Bearing Units

Write for bulletins on any of the above

STEPHEN S-A DAMSON MFG. CO.

6 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Schoettle Case Histories:

true story of a

Purchasing Agent in Hot Water

CASE HISTORY #41 Food company* was looking for box-making genius. Purchasing Agent said he was really in hot water over company demands for a box to hold two jars of instant coffee . . . Requirements: maximum display value, automatic load, low cost. (We've heard that before!) Fifteen companies (including Schoettle) were asked to create design . . . Result: Schoettle got the order. Company said Schoettle was only one to come up with smart, practical idea! (We've heard THAT before, too!)

CASE HISTORY #93 Pies were being crushed! Consumers complaining that they couldn't carry them home without pies becoming mush . . . Problem was dropped in Purchasing Agent's lap. Boy, was he in hot water! Only one thing to do: SOS to Schoettle . . . designers worked over-time. Result: a patented new folding box construction with handle on top, at no extra cost! Now Mrs. Housewife carries her pies home in apple-pie order.

Schoettle welcomes problems. We subscribe to the old marine maxim: "Difficult problems solved promptly, impossible ones take a little longer!" Send that folding box "problem child" to Schoettle. You'll get smart, practical solutions!

*name on request

EDWIN J. SCHOETTLE CO.

533 NORTH ELEVENTH STREET • PHILADELPHIA 23, PENNA.

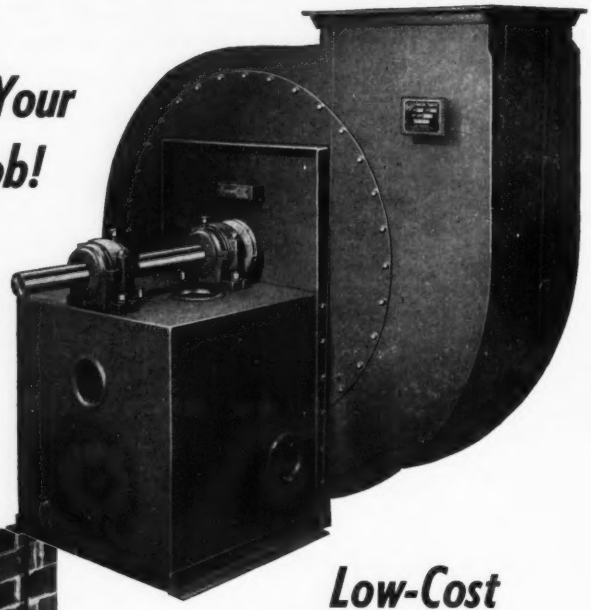
Designers and Manufacturers of Paper Boxes with Buy Appeal

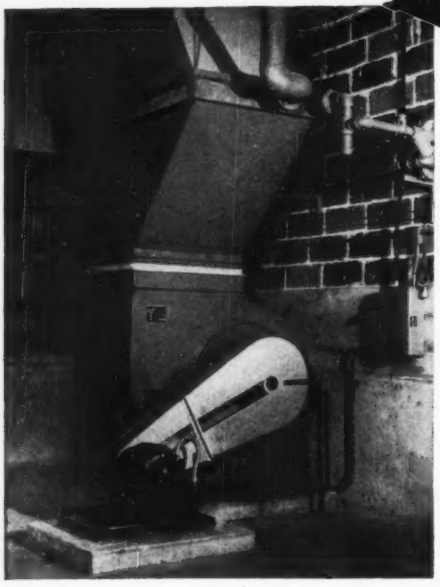
"Buffalo"

Tips on Better VENTILATION

Right Solution To Your HOT EXHAUST Job!

Heat is always hard on a fan, but this "Buffalo" Industrial Exhauster is built to handle gases up to 750° F. Of all-welded heavy steel plate construction, it has the additional protection of a heat slinger (the small rotor mounted on the shaft next to the housing). Available with Air Wheel or Material Wheel for conveying. WRITE FOR BULLETIN 3576-B for the complete line of "Buffalo" Industrial Exhausters.





Low-Cost Air Moving!

"Buffalo" Limit-Load Fans are the choice for many of the world's largest air-moving jobs. Quiet, vibration-free, non-overloading and efficient. You can put these fans on continuous exhaust, ventilation or air conditioning supply service, with consistently good results. And you have a wide range of sizes—from 600 cfm to 500,000 cfm.

FOR YOUR FILES!

Write for these free engineering bulletins covering these two important types of fans—No. 3576 on "Buffalo" Industrial Exhausters and No. 3737 on Limit-Load Fans.

DIAMOND JUBILEE 75TH ANNIVERSARY

"Buffalo" FIRST FOR FANS

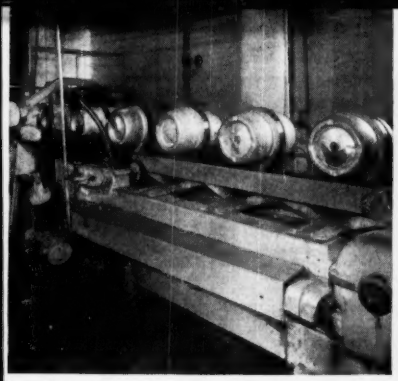
BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, NEW YORK

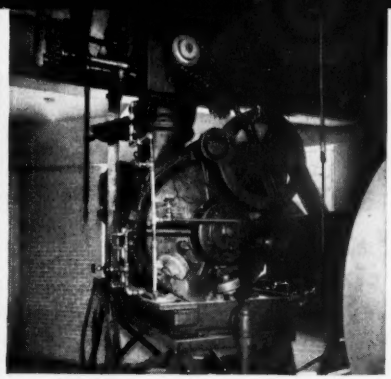
PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

VENTILATING	PRESSURE BLOWING AIR CLEANING	COOLING AIR TEMPERING	HEATING INDUCED DRAFT	FORCED DRAFT EXHAUSTING

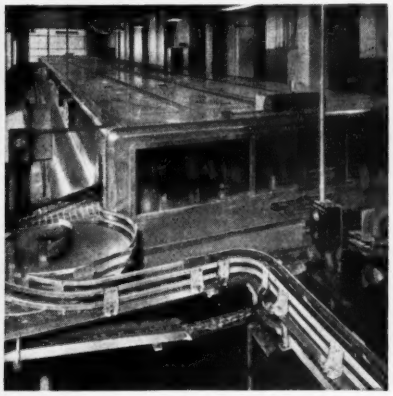


Keg scrubber – A constant stream of water at 130°F. plays over these barrels and reaches bearings on conveyor.



Wet-grain press – After being heated to 180°F., grain is then pressed dry. Hot water comes in contact with bearings.

Bottle soaker and washer – Bottles are first cleaned with strong alkali at 180°F., then washed with water. These conditions make bearing lubrication difficult.



Pasteurizer – Beer is pasteurized in this modern machine which is subjected to constant water spray ranging from 80°F. to 140°F.

No trouble brewing for bearings!

A midwest brewing plant employed seven different greases in a variety of applications. Despite the use of these special products, the operators experienced difficulty. The greases would not withstand both water and high temperatures. Frequent applications were necessary.

A Standard Oil lubrication specialist was called in on this problem. Upon his recommendation, STANOLITH Grease – a lithium-soap product with the ability to withstand both heat and water – was given the job.

As a result, STANOLITH has replaced all seven greases formerly used and *has done a better job in each type of application.* Through its use over a two-year period, grease consumption has been reduced 20% and time spent in applying grease cut 50%.

STANOLITH Grease can prove its remarkable versatility in your plant, too. Its high mechanical and chemical stability plus its extreme resistance to heat and water qualifies it to replace a variety of special greases.

STANOLITH
TRADE MARK
Greases

To obtain maximum benefits from STANOLITH, use the services of a Standard Oil lubrication specialist. His headquarters are near your plant. How you can benefit by his on-the-spot service is explained at the right. Standard Oil Company, 910 South Michigan, Chicago 80, Illinois.

What's YOUR problem?

Mr. D. V. Wills of Standard Oil's South Bend office is the lubrication specialist who helped this Midwest brewing company solve a difficult lubrication problem.

He is one of many Standard Oil specialists located throughout the Midwest. These men have the practical experience and special training to handle lubrication problems on any type of operation.

Take advantage of the service offered by the lubrication specialist nearest your plant. You can reach him by phoning your local Standard Oil Company (Indiana) office. Why not call, today, and arrange to discuss with him the advantages offered you by STANOLITH and other outstanding products such as:

STANOIL Industrial Oils—This general-purpose line of oils provides cleaner operation of hydraulic units and supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of specials oils and lubricants.

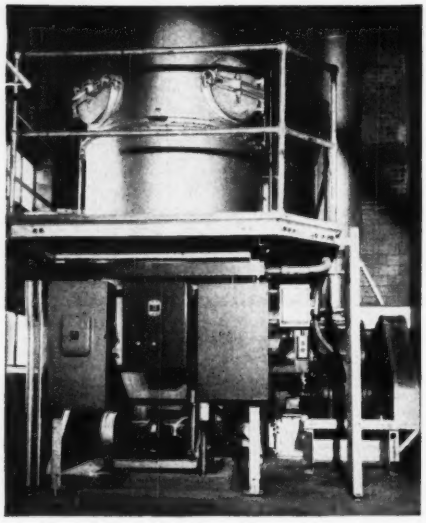
SUPERLA Greases—Available in a wide range of consistency grades and in both lime-soap and soda-soap types, SUPERLA Greases cover a wide range of applications. These efficient products are comparable in quality with the highest type of special greases.

STANORUST Rust Preventives—The eight grades of STANORUSTS form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically developed for its intended use. The grades range from a fingerprint remover to a heavy petrolatum that protects against corrosion for years under the most severe outdoor exposure.

STANDARD OIL COMPANY **STANDARD** *(Indiana)*

In almost any size bakery

Handling Flour in Bulk Pays Off



Airveyor filter and exhauster, providing effective filtration and air supply.

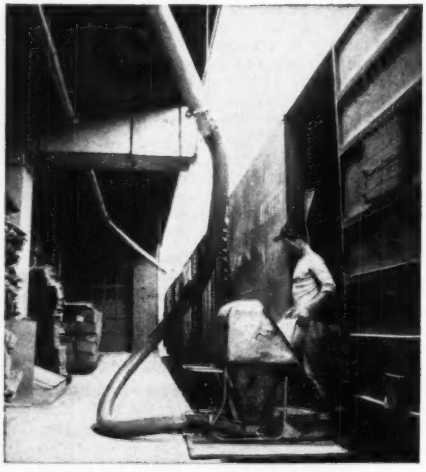
In the smaller size bakery, just as in the large ones, it costs less to handle flour in bulk. Convenient, dustless, and economical, the Airveyor reduces shrinkage and contamination. Above all, it's the sure way to cut handling costs.

The Airveyor flows flour at rates from a few hundred pounds to 20 tons an hour, through a combination of flexible and permanent self-scouring ducts, not only from Trans-Flo cars, but also from sealed bulk trucks, portable containers, as well as bags.

A centralized control enables the operator to direct the flow to storage bins, sifters, blended stock bins and, ultimately to scale hoppers above mixers.

There is no obligation for proposal drawings and estimates, backed by 26 years' experience in every phase of handling dry, pulverized materials by air. Simply request a Fuller engineering study.

Flexible metal hose attached to Trans-Flo car to unload flour.



Portable bag-dump hopper; introducing flour into conveying line, from box car to storage.

Fuller

FULLER COMPANY, Catasauqua, Pa.
120 S. LaSalle St., Chicago 3—420 Chancery Bldg., San Francisco 4

THE FRED D. PFENING COMPANY, COLUMBUS 8, OHIO
DISTRIBUTOR TO THE BAKING INDUSTRY IN THE UNITED STATES AND CANADA

A-147
1133

THESE DRUMS PROVED BEST BY TEST

At Tobin Packing Co.
ALBANY DIVISION

The standards for drums at Tobin Packing Co. sound simple in print, but are hard to meet in practice.

The drums have to stand up under rough, daily plant handling—they have to be completely sanitary and unable to affect taste or flavor in any way—they have to be light enough to move around conveniently, and they have to be easy to clean.

This packer investigated. They tried Wear-Ever Aluminum Drums. Now, they're satisfied they've found the best. Wear-Ever drums are available in both 30 and 50 gal. sizes, and are available with slip-over cover, hinged cover and dolly.

Outstanding because:

CUT REPLACEMENT COSTS—Made of extra hard, extra thick aluminum alloy.

SANITARY—Smooth, seamless, rounded corners, continuous welds. Approved by Government Inspectors and local sanitary codes.

NON-RUSTING—Unaffected by moisture. Corrosion resistant.

EASY-TO-HANDLE—Light, in spite of the thick metal and hard alloy used.

ODORLESS—Will not absorb and pass along odors. Can impart no odor of its own.

COOLS PRODUCTS QUICKLY—Since aluminum is a good conductor of heat, an aluminum drum quickly carries off the heat of its contents when placed in cool air.

WEAR-EVER Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

Standard of Quality for more than 50 years

MAIL COUPON TODAY

The Aluminum Cooking Utensil Co.,
310 Wear-Ever Bldg., New Kensington, Pa.

Please supply us with complete details about your line of heavy-duty aluminum drums.

NAME .....

TITLE .....

Cut out, clip to your letterhead and mail today

This attractive package is representative of the fine folding cartons Empire Box is producing for leaders in industry.

thinking about the quality of your cartons?

"Scientific Packaging" at EMPIRE BOX assures Fine Quality... Low Cost!

Cheer up! Get the low-down on Empire's "scientific packaging" that takes the guesswork out of carton quality. At Empire Box, every phase of production is under the supervision of expert packaging engineers. For instance, in the modern, completely equipped laboratory, trained technicians guard carton quality . . . constantly seek to improve quality through the development of superior paperboards from our own mill.

The result of this strict laboratory control — this ceaseless search for better cartons — is finer packaging quality — greater packaging economy for you.

Call Empire Box when next you need folding cartons — you'll be on the track of top carton quality at the price you want to pay.

EMPIRE BOX CORPORATION

FINE FOLDING CARTONS SINCE 1903

CHECK THESE 3 WAYS YOU CAN SAVE WITH THIS MULTI-PURPOSE INSTRUMENT

Here is the most sensible idea you've ever seen in a recorder or controller—an instrument you can change as your instrument needs change, that you can add to, subtract from, or whose functions you can increase or decrease at little or no expense.

✓ **Save money when you add new functions by adding only those new assemblies needed.**

✓ **Save time-delays by making changes on the job site without returning to factory.**

✓ **Save money on inventory. Parts are interchangeable, fit all Gotham Convertible recorders. You can service a whole group with a minimum stock of basic elements.**

What you can do with the Gotham Convertible

Depending on the chart size of the recorder (6″, 9″ or 12″) you can have a 1-2-3 or 4 pen recorder with 14 pressure, temperature and time operation combinations or a recorder-controller with 38 possible pressure, temperature, and time combinations.

SELF-CONTAINED PORTABLE RECORDER

A portable recorder which has a carrying handle, legs and retaining holder for capillary and bulb. Built from Gotham standard elements, interchangeable with other Gotham instruments. 6", 9" and 12" chart sizes. Mercury, Vapor or Pressure Activated. Spring or electric chart drive. See Catalog 400.

RECORDING PSYCHROMETER

Incorporates the same highly accurate and responsive thermal systems and contains all other Gotham standard convertible features. Wet and dry bulb type. Motor-driven suction fan. 12" chart size. Catalog 400.

RECORDING HYGROMETER

A 2-pen recorder of the wet and dry bulb type. Mercury or Vapor Actuated. 9" and 12" chart sizes. Available with variety of wet and dry bulb assemblies depending on application. Catalog 400.

GOTHAM INSTRUMENTS

Keep everything under control with Gotham

GOTHAM INSTRUMENTS
Division of American Machine and Metals, Inc.
Dept. 2, 233 Broadway
New York 12, New York

Please send me a copy of your

- ☐ Catalog 100—Industrial Thermometers
- ☐ Catalog 200—Dial Type Thermometers
- ☐ Catalog 400—Recorders, Psychrometers, Hygrometers
- ☐ Catalog 500—Controllers
- ☐ Have your representative call. No obligation.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

No. 1-B electric vibrating Feeder—for small-capacity operations up to 3500 pounds per hour. Ideal for laboratory use.

VIBRATING EQUIPMENT

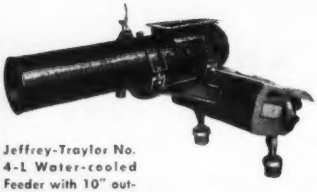
FEEDERS **COOLERS**
DRYERS **CONVEYORS**
PACKERS **SCREENS**

A type and size to meet requirements in continuous processing—at low over-all cost.

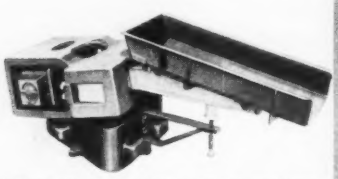
Absolute control over flow of wide variety of materials.

ULTIMATE IN FLEXIBILITY!

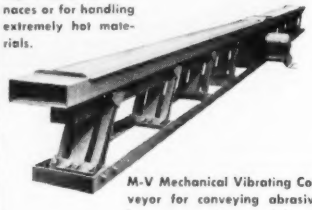
Literature Available



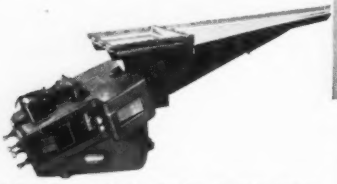
Jeffrey-Traylor No. 4-L Water-cooled Feeder with 10" outside diameter x 4' long water-jacketed deck. For feeding to high temperature furnaces or for handling extremely hot materials.



Jeffrey-Traylor No. 3 electric vibrating spark-proof Feeder with 12" x 30" open-pan deck. For feeding operations in hazardous atmospheres or under extreme moisture conditions.

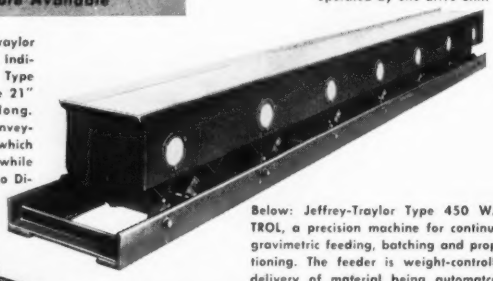


M-V Mechanical Vibrating Conveyor for conveying abrasive, lumpy or rough materials, hot or cold, dry or wet, as well as fine materials. Up to 80' can be operated by one drive unit.

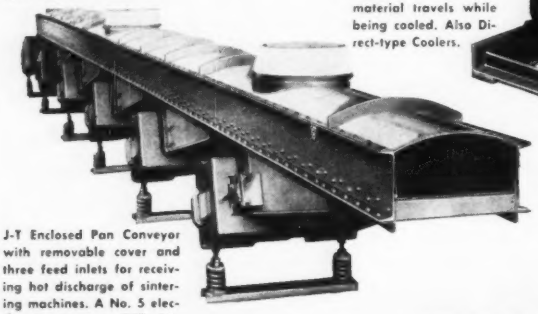


Jeffrey-Traylor electric vibrating Spreader Feeder, 14" wide x 70" long with one edge tapered to spread to 55" width.

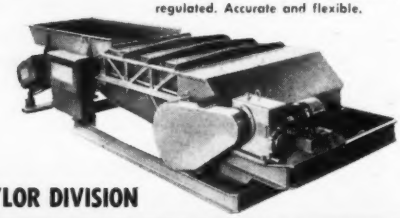
Right: Jeffrey-Traylor electric vibrating indirect-type Cooler. Type HI-21F open type 21" wide and 18' long. Has solid plate conveying surface over which material travels while being cooled. Also Direct-type Coolers.



Below: Jeffrey-Traylor Type 450 WAY-TROL, a precision machine for continuous gravimetric feeding, batching and proportioning. The feeder is weight-controlled, delivery of material being automatcally regulated. Accurate and flexible.



J-T Enclosed Pan Conveyor with removable cover and three feed inlets for receiving hot discharge of sintering machines. A No. 5 electric vibrating type, 25" wide x 45' long.



JEFFREY-TRAYLOR DIVISION

CAPACITIES—FROM A FEW OUNCES TO TWO THOUSAND TONS PER HOUR

THE JEFFREY

1877 75 1952

YOU FORTIFY SALES WHEN YOU

Fortify Foods WITH

Pfizer Vitamins

• You give your food products added appeal that builds sales when you fortify them with essential vitamins. That's because today's homemakers are becoming increasingly vitamin conscious. Daily they shop for the foods that bring the best nutritional values to their families...vitamin fortified foods.

Pfizer, pioneers and leading manufacturers of vitamins for more than fifteen years, has accumulated a vast store of experience in food fortification. If you are considering fortifying one or more of your food products, Pfizer will be happy to place this wealth of information at your disposal. Developmental studies, shelf-life tests and other aspects of food fortification can be made simpler by calling Pfizer.

Pfizer Vitamins for Food Fortification

Vitamin A—Crystalets* — A dry, free-flowing form of pure Vitamin A Acetate. Extremely stable. Eliminate the need for excessive overages.

Vitamin A Palmitate—For food processors requiring a form easily dispersible in water or soluble in oil. A light-colored liquid vitamin A of high purity and superior stability.

The Vitamin B Family—As a pioneer in enrichment concentrates for flour and enrichment wafers for bread, Pfizer has long recognized the need for fortifying other foods with B vitamins. Available for fortification are: Thiamine, Riboflavin, Niacin and Vitamin B_{12}, the newest member of the B Complex group.

Vitamin C—Ascorbic Acid—In addition to being a nutritional essential, it is also an effective antioxidant in many foods and beverages.

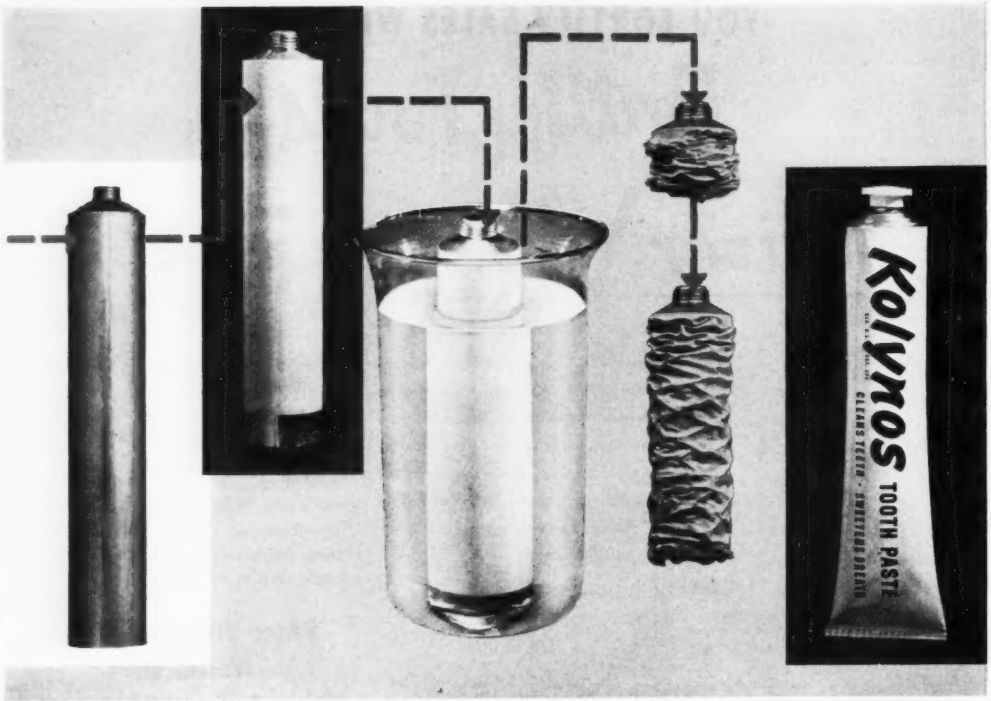
Write for your copy of the booklet "Pfizer Products for Food Fortification" today!

*TRADE MARK

CHAS. PFIZER & CO., INC.
630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.

Pioneers and Leading Manufacturers of Vitamins

PFIZER



How coatings based on VINYLITE Brand Resins are tested for use on collapsible aluminum tooth paste tubes. Tube blank (left) is first roller-coated and dried. Sample is next soaked in tooth paste and soapy water solutions, then crushed, drawn out again, and examined for cracks, chips, peeling, and lifting. Right, Kolynos tooth paste tube finished by Victor Industries Corporation, 193 Newell St., Brooklyn, N. Y., with coatings based on VINYLITE Resins, made and tested by Kirker Chemical Company, One East 11th Street, Paterson 4, N. J.

Coatings for Flexible Products

ECONOMICAL FINISHES BASED ON VINYLITE BRAND RESINS CAN BE BENT, CRUSHED, TWISTED

If there is any package that gets a worse beating than your favorite tooth paste tube, please let us know. It will be another place to use tough, resilient coatings based on VINYLITE Brand Resins.

So adherent are these coatings on collapsible aluminum tubes that, when crushed and then drawn out, again as shown, they neither crack, chip, peel, nor lift. This in spite of previous twenty-four-hour soakings —one in a solution containing 10 per cent of the tooth paste itself and another containing 1 per cent soap.

Of course the user doesn't straighten out his tube once he crushes it. But, this proof of the ability of the coating to survive extreme rough treatment means that the consumer won't be disgusted with a tube that flakes off on his hands. It means that the manufacturer's name and distinctive colors will always be recognizable.

Highly resistant to alkalies and most strong acids, coatings based on VINYLITE Resins are flexible, tough, economical and excellently suited to fast finishing schedules demanding a short bake.

For defense, business and industry, these materials are made in virtually every conceivable color. They readily accept multi-color printing. Easily applied by roller, spray, or brush, they are widely used on metal foil, paper, cloth and other packaging materials to give utmost protection and beauty.

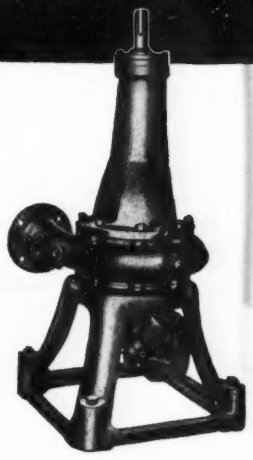
Why not investigate how they can be used to improve your packages. Ask for more information and a list of representative suppliers of coatings based on VINYLITE Brand Resins. Write Dept. MT-74.

Vinylite
BRAND
RESINS

TRADE MARK

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.

There's No Catch in It!



No, not a catch anywhere in this Fairbanks-Morse *bladeless* impeller. That's how food damage losses are eliminated and handling costs *cut way down!*

The chain in the picture follows the water path through the single channel impeller . . . you can see there are no blades or projections to catch and damage food products.

Even the most delicate fruits and vegetables . . . *even* hard-boiled eggs . . . can be handled without damage with this Fairbanks-Morse Bladeless Impeller Pump.

For complete information, call your Fairbanks-Morse Branch Pump Engineer or write to Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE,

a name worth remembering when you want the best

PUMPS • DIESEL LOCOMOTIVES • ELECTRICAL MACHINERY • SCALES • HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY • MAGNETOS

Thanks to you

it's Flo-Sweet's 25th Birthday

Our sincere thanks to the many progressive food processors who, sharing our vision, have helped us continually improve Flo-Sweet Liquid Sugar quality and service. As the only refinery devoted exclusively to the industrial user of sugar, we will always strive to deliver the very finest Liquid Sugars backed by unmatched engineering service.

REFINED SYRUPS & SUGARS, INC.

—the only refinery serving industrial sugar users exclusively

Yonkers 1, New York

Make These 4-WAY SALT SAVINGS

yours with the help of International Salt Company's Industrial Engineers

1. SAVINGS ON STORAGE by engineering the most efficient and compact salt storage system to fit your situation.

2. SAVINGS IN LABOR by reducing effort and supervision involved in salt or brine handling.

3. SAVINGS ON WASTE through accurate salt measurement and ending of spillage and spoilage.

4. SAVINGS IN USE. Research and field work with hundreds of industries in many fields equip International to show you how best to use salt in product processing—and for product improvement, too.

No matter what type of salt your company uses, you will find it profitable to consult with International Salt Company's Industrial Division.

As part of International's service to industry, this experienced organization will acquaint you with latest advances in salt use in your field. And can advise you on all aspects of salt storage and handling, brine making, and salt and brine uses.

Here you'll find four ways to save money—and very probably, *important* money.

Qualified on all Counts

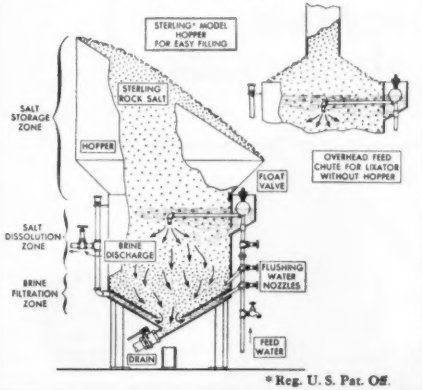
International Salt Company's Industrial Division is endowed with the experience of one of America's largest salt producers. This company produces all types of salt and operates from strategically located mines and refineries.

As supplier to all industry, it is constantly in touch with salt developments in all fields. Many such developments, in fact, have been pioneered by International Salt Company.

LIXATOR*—A NOTABLE EXAMPLE

The Lixator is one of International's outstanding advances in salt technology. Utilizing Sterling Rock Salt, the Lixate principle of self-filtration, invented and developed exclusively by the International Salt Company, provides a steady flow of pure, clean, fully saturated brine.

No handling or attention is required beyond the hopper-loading stage—gravity does all the work. The Lixate Process is adaptable to almost numberless industrial requirements, large or small.



*Reg. U. S. Pat. Off.

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

SALES OFFICES: Atlanta, Ga. • New Orleans, La. • Boston, Mass. • St. Louis, Mo. • Newark, N. J. Buffalo, N. Y. • New York, N. Y. • Cincinnati, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.
ENGINEERING OFFICES: Atlanta, Ga. • Chicago, Ill. • Buffalo, N. Y.

NO TIME FOR INTERRUPTION

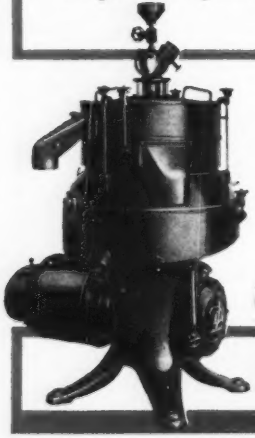
No need to run if the problem is continuous separation or clarification — De Laval centrifuges are the answer. Each De Laval machine is designed to do, without interruption, one of these three basic functions:

a) Continuously separate two liquids
b) Continuously clarify one or two liquids
c) Continuously separate two liquids plus the simultaneous continuous removal of solids from one or both liquids

While each chemical separation problem has its individual points of difference, certain resemblances in behavior of similar liquids within a centrifuge are often apparent. De Laval has been solving problems involving centrifugal force for more than 70 years, and in that time De Laval engineers have successfully separated many hundreds of mixtures. *Your* problem may be quite similar to one that has already been analyzed by De Laval engineers. It will pay you to find out.

CONTINUOUS OPERATION *is all-important in processing*

- ***to speed production***
- ***cut costs***
- ***improve quality***



THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

DE LAVAL

for CONTINUOUS Separation with Centrifugals

The Modern Food Container!

. . . is finding wide success as an individual coffee bag due to its many fine features

VISKON IS ECONOMICAL!
Gives top performance where a "breather" type package is required—at little cost.

VISKON IS HEAT-SEALABLE!
Generally, VISKON seals at between 350° and 500°F, corresponding with dwell time and jaw pressure.

VISKON IS STRONG, DURABLE!
Holds its shape, yet is soft and flexible. Has exceptionally high *wet* strength.

VISKON IS TASTELESS!
It's non-toxic, completely sanitary for use as a food container. Lint-free and non-raveling.

VISKON® nonwoven fabrics
—another product to fit today's needs by
THE VISKING CORPORATION
NORTH LITTLE ROCK, ARKANSAS

VISKON nonwoven fabrics offer a new product for packaging where porosity, product breathing, absorption, diffusion, infusion and *wet strength* are needed. **VISKON** opens up new and better ways to present your product to the consumer. Already **VISKON** has proven a success in coffee packaging. **VISKON** is suitable for packaging of tea, dried food, spices, etc.

VISKON is made of rayon and cotton fibers bonded with cellulose . . . can be safely used in connection with foods. It is non-toxic, tasteless, odor-free, lintless and completely sanitary.

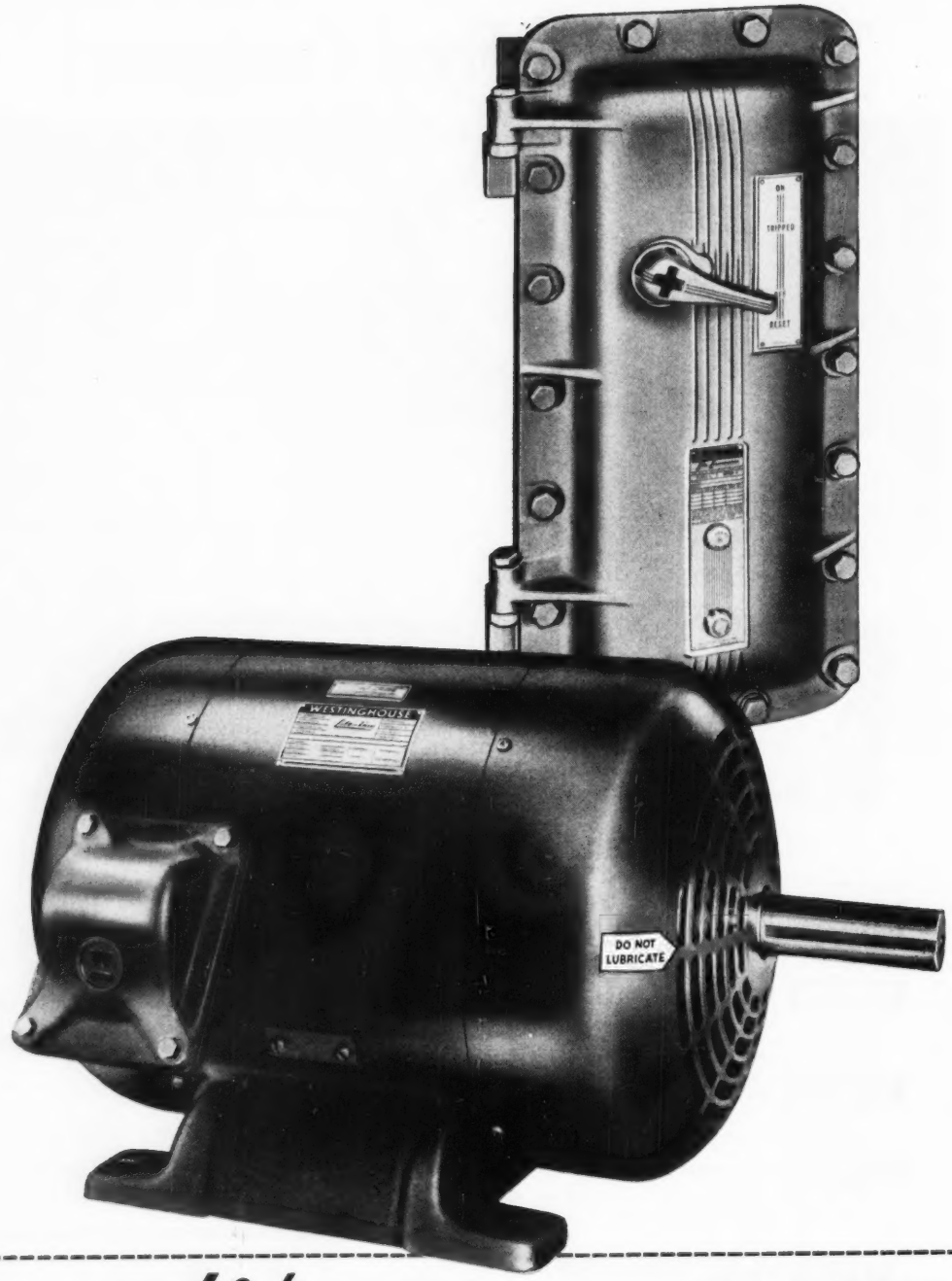
VISKON is available in mill rolls, tapes or sheets—in a wide variety of weights and grades of either cotton or rayon fabric. Investigate **VISKON** today for your food packaging problems. Mail handy coupon below for additional information and samples . . . do it today!

Please send more information about VISKON for use as a product container.

THE VISKING CORPORATION, Dept. FC
Box 72, North Little Rock, Arkansas

Name .....
Position .....
Company .....
Address .....
City ..... *Zone* ..... *State* .....

For more information, use post card on last page.



WHAT *Life-Lines* REALLY DELIVER IS MORE SERVICE...LESS SERVICING

The time to stop explosions is before they start

And here's the equipment to do it

Dual Label Explosion-Proof Motor

In any location where Class II, Group G, or Class I, Group D explosive materials present a hazard, you can operate this Life-Line explosion-proof motor safely. It's underwriter approved for *both* explosive dusts and explosive vapors.

And the Life-Line offers extra protection against outages. Heavy steel construction provides greatest protection against physical damage. Pre-lubricated bearings need no further lubrication . . . eliminate outages due to faulty greasing. Superior winding techniques and insulation reduce electrical failures. Together they add up to longer life . . . less servicing.

For Hazardous Locations—Life-Linestarters®

Specially reinforced, cast enclosures with wide flame seals are available in Class I, Group D. Class II, Groups E, F, G are also available. Bi-metal overload relay protection and AB Circuit Breakers cut down time. In case of fault, no need to remove cover to reset breaker or overload relay mechanism. Service is restored immediately.

Simple design, single operation mean fewer operating parts to foul. Seesaw action of clapper prevents accidental operation. Kickout spring assures positive opening. Exclusive "De-ion®" arc quenching plus silver-to-silver contacts eliminates contact filing. Compare any other starter and see why Life-Lines offer more service with less servicing.

Together Life-Line motors and starters offer the food industry a new concept in performance. You get more service on the job . . . less down time and servicing. Ask your Westinghouse representative for complete details on both, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21701

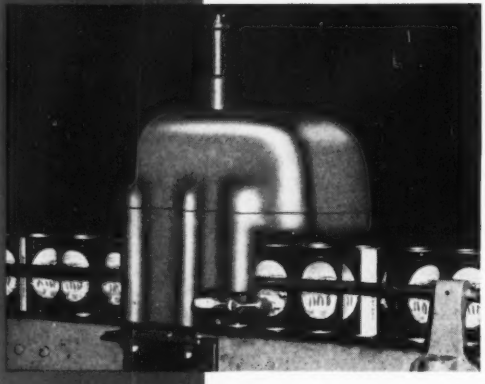
YOU CAN BE SURE...IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

TWO BARRY-WEHMILLER AIDS TO BETTER PRODUCTION — Saving Time and Labor!

the ERMOLD Automatic Multiple Labeler

Because the multiple principle enables the Ermold to label containers in rows, you get high volume labeling at slow machine speed. Slow speed assures perfect, accurately registered, clean labeling; reduces jamming, breakage, and lost time. It's flexible, too, handling all standard size beverage bottles and food bottles and jars from half pint to quart size.

Design simplifies maintenance, assures long life with less wear. Fully automatic in operation.



the BRUCEWAY Can Marker

Requiring no outside power, the Bruceway Can Marker cuts your line costs by being activated by the movement of cans along the conveyor. It operates only when cans are moving on the line at speeds up to 600 per minute without adjustment or attention. The machine is simple and sturdy in design, weighs only 35 pounds and costs only a fraction of conventional equipment. It pays for itself in savings.

The advanced engineering and quality construction of all Barry-Wehmiller food processing equipment, including pasteurizers, coolers and freezers, may well cut your production costs, too. Write for information, sending your requirements.

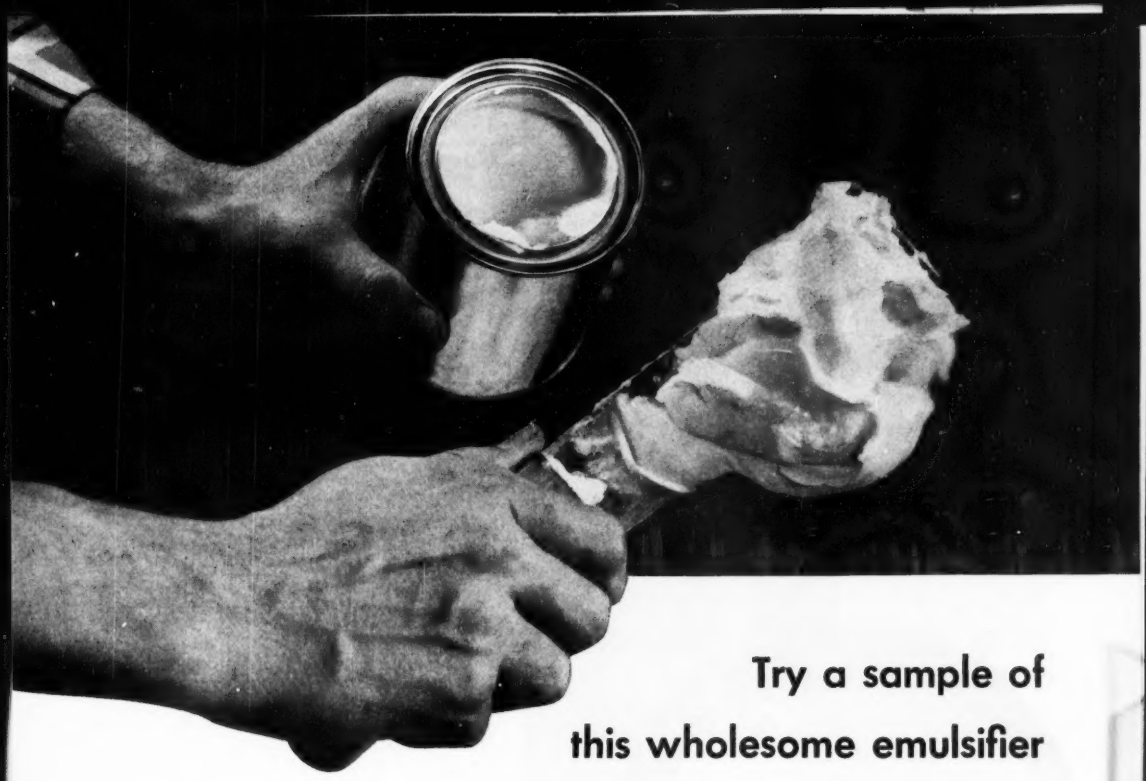
B-W BOTTLE CLEANERS · PASTEURIZERS & PROCESSORS

BARRY-WEHMILLER MACHINERY CO.

4660 WEST FLORISSANT AVENUE · ST. LOUIS 15, MO.

BW · BARRY-WEHMILLER MACHINERY CO. · HALL GREEN · BIRMINGHAM · WHITCHAM JUNCTION, SURREY, ENGLAND · IN GREAT BRITAIN

BW-280



Try a sample of this wholesome emulsifier

DPi

distillers of monoglycerides from natural fats and oils

It's DPi's Myverol® Distilled Monoglycerides. And, it's not only an excellent emulsifier, but a wholesome food as well.

Made from natural fats and oils and purified by molecular distillation, it contains 90% monoglycerides—is largely freed of diglycerides and other extraneous materials. The product is homogenized with nitrogen to produce a smooth, white cream of dependable uniformity.

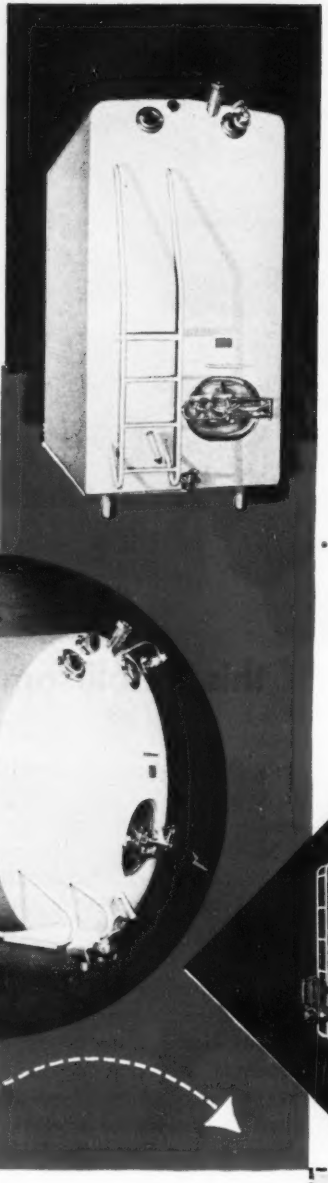
Useful for baked goods, shortening, margarine, peanut butter, dessert toppings, and other food products, Myverol Distilled Monoglycerides are available in whatever quantities you require. We shall be pleased to send you a sample for your investigation. Just write ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith, Ltd., Montreal and Toronto.

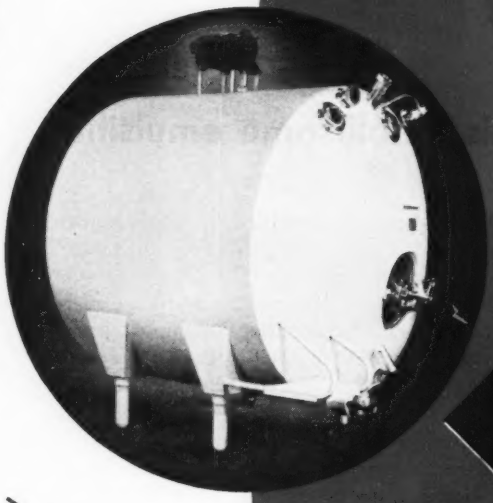
Also... vitamins A and E... high vacuum equipment... more than 3500 Eastman Organic Chemicals for science and industry

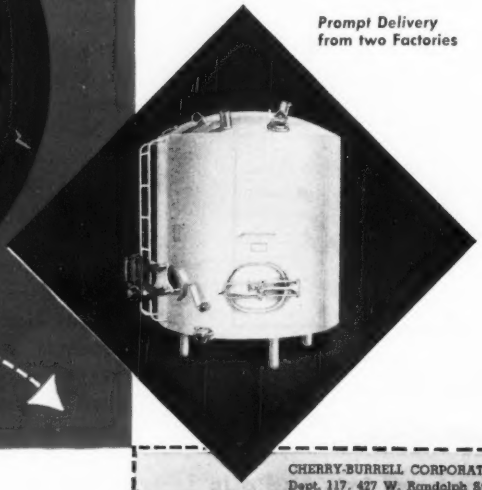
which

storage tank

best meets your needs?







Prompt Delivery from two Factories

Name your shape

Horizontal, Vertical, Rectangular.

Name your size

500 through 7000-gallon capacity. Other sizes available.

Name your refrigerant

Cold wall for ammonia, freon, sweet water. Submerged coil. Spray jacket. Plain insulated.

Name your special needs

Single Shell • Air Agitators • Extra Manhole Doors • Special Agitators • Liquid Gauges • Heavier Insulation • Special Outlets and Inlets

...and then name Cherry-Burrell

Cherry-Burrell has—*or will make*—the tank that can solve your storage problem...no matter how typical or unusual it may be. See your Cherry-Burrell representative for further details...or clip coupon.

CHERRY-BURRELL CORPORATION
427 W. Randolph Street, Chicago 6, Ill.
Equipment and Supplies for Industrial and Food Processing
FACTORIES, WAREHOUSES, BRANCHES, OFFICES
OR DISTRIBUTORS AT YOUR SERVICE IN 56 CITIES

CHERRY-BURRELL CORPORATION
Dept. 117, 427 W. Randolph Street
Chicago 6, Illinois

Send further storage tank information ☐

Have Representative contact me ☐

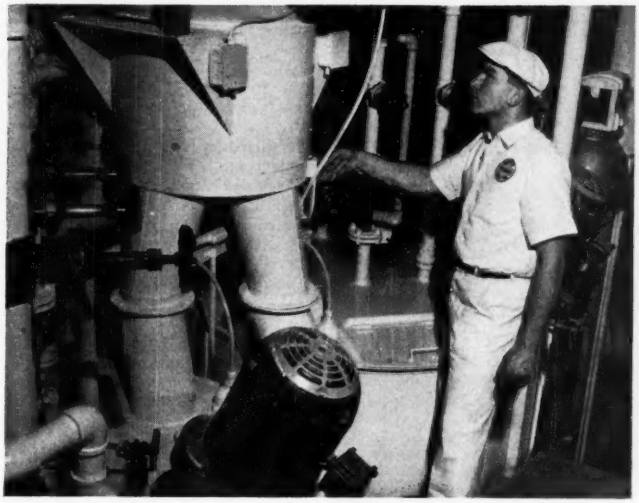
Name .....

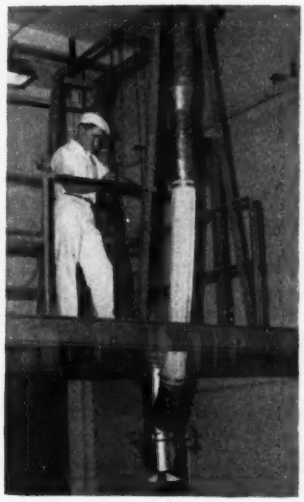
Company .....

Address .....

City ..... Zone ... State .....

5239





STREAMLINED PLANT turns out bulk-granulated, liquid, and blend sweeteners; ships them in economical amounts as needed by food processors. Left: Operator adjusts turret hopper to feed the melters below. Mixer motor is seen in foreground. Right: Tasco-designed loading spreader is winch-lowered through port ready to fill tanks in special truck.

Now—*Local* Sugar Processing

Brings Bulk-Sweetener Benefits To More Food Plants

JOHN R. GRANTHAM and C. R. HAVIGHORST

Respectively, Engineer, The Amalgamated Sugar Co., Portland, Ore.; and Associate Editor, "Food Engineering"

For food processors operating close to sugar refineries, the switch from unwieldy bagged sugar to convenient bulk-granulated and liquid sweeteners has been rapid, easy, and profitable.

But for the many operators not adjacent, this desirable transition has been either difficult or flatly out of the question—due to delivery charges rising with distance, plus restriction to volume loads requiring complex and costly in-plant handling facilities.

Today, however, an answer to this problem is seen in the new type "sugar service" set up in the Northwest by The Amalgamated Sugar Co.—based on simple bulk-sweetener processing operations and capped by special-carrier deliveries in the augmented market area.

First, a review of the picture: Refineries producing liquid sugar sell their product on the same price basis as they do granulated, making no charge for melting—as would a beet sugar refiner. Freight, charged to the customer, is also figured on a sucrose-solids basis, with the refiner absorb-

PIONEERING A NEW, BROADER SERVICE

". . . A most enterprising new kind of sugar processing and delivery—meeting the long-felt and constantly growing need for broader, more convenient bulk sweetener services."

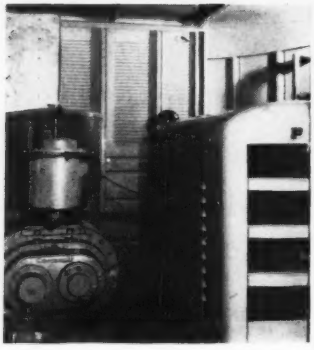
Thus may be hailed Amalgamated's special operations now offering bulk liquid, blend, corn syrup, and granulated products in the Seattle and Portland, Ore., areas.

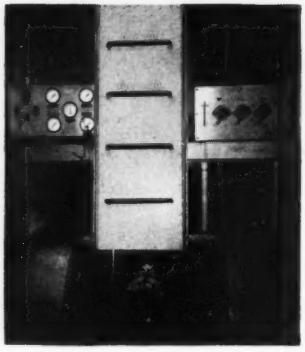
You'll read here how these mechanized and highly instrumented facilities supply plants formerly out of range—including those using medium amounts—via simply operated sugar-process lines set up at rail-served focal points from which special bulk-trucks "work" in sizable delivery radii.

Thus, many new processor-customers now reap the benefits of mechanized sweetener-handling, simplified and more sanitary storage, uniformity of syrups, and ingredient cost savings, while being able to eliminate the former tedious plant mixing.

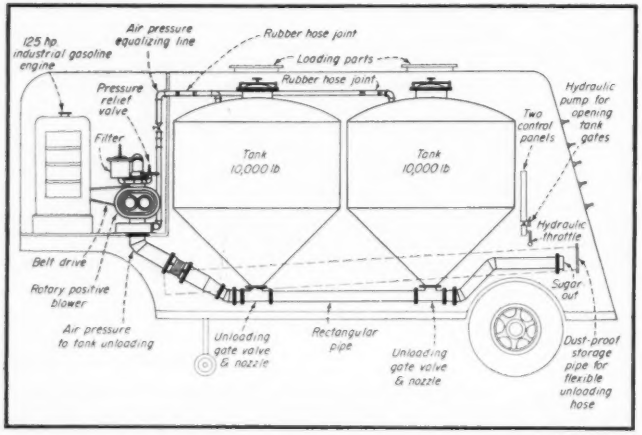
Then for a graphic diagram-and-photo presentation that "virtually puts you right on the new process line," turn to our special 4-page foldout FE Picture-Flowsheet on pages 136-139.

Special Trailer Is Key





CARRIER IN ACTION and closeups. Top: Granulated sugar is air-conveyed to customer's tank via flexible pipe. Left above is forward section. Belt driven air blower is powered by engine alongside. Right above is rear section. View shows engine and blower controls (left panel) and bin gate regulators (right panel). Unloading duct is seen lower center.



COMPONENTS: Trailer (Utility Trailer Mfg. Co.); air-conveying system (Sutorbilt Corp.); industrial motor (Ford); hydraulic controls (Blackhawk Mfg. Co. and Adel Products Co.); unloading instruments (Ashcroft Co.); and bulk-granuated truck loader (Tasco). Unit was designed by S. M. Heiner and others on Tasco engineering staff.

ing the cost for transporting water in the product. This limits the distance that liquid sugar can be shipped profitably by a refiner.

In the case of bulk-granulated, new type insulated, enclosed rail cars were built for the sugar transport. But these did not completely solve the problem.

Usually, only larger food manufacturers order full rail cars of bulk-granulated (1,000 100-lb. bags) or full tank cars of liquid sugar (7,400-10,000 gal.), these quantities being excessive for the moderate size or smaller plants. Such big lots also require expensive material handling systems and special, adequate, safe storage facilities. Added to this, in the case of beet sugar, is the fact that only the larger food plants can provide melting and mixing equipment for making liquid or blended sweeteners.

As for the market, it was noted that there are a great number of plants normally buying sweeteners on the LCL (less than carload lot) basis. And, in the aggregate, these account for a significant proportion of the total volume of industrial sweetener business.

It was then envisioned that the only manner in which such plants could be supplied efficiently and economically with bulk-granulated, liquid sugar, or blend was for a refiner to build intermediate bulk-storage, melting, and blending plants. Such plants could offer a variety of delivery methods and facilities in order to supply the demands from all sizes and kinds of plants.

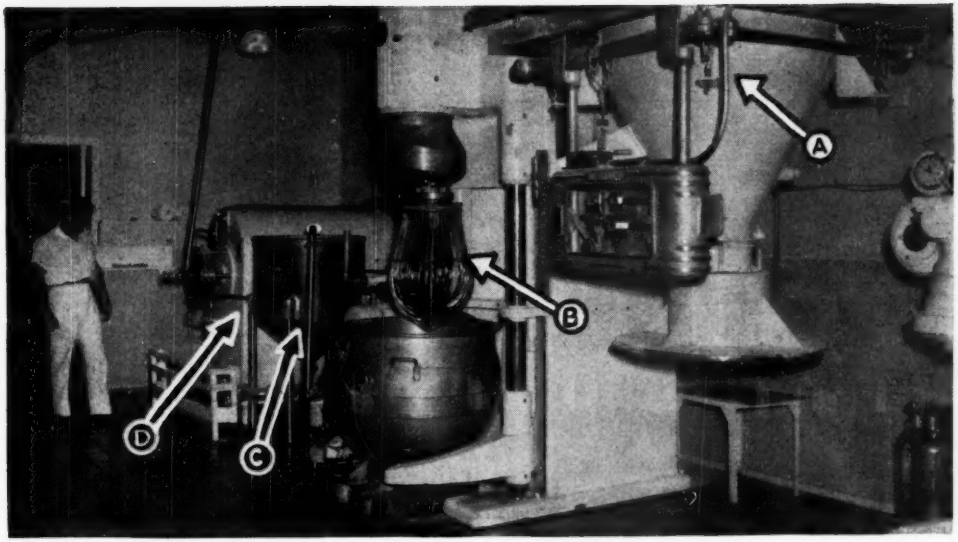
Quick to recognize this opportunity in the Pacific Northwest, Amalgamated, of Ogden, Utah, built the first decentralized bulk-granulated sugar plant in Seattle, then recently began operation of a more complete plant in Portland. This latest plant is an integrated bulk sugar storage and liquid sugar melting plant, with facilities for making blended sweeteners. It is now supplying food processors in this region with truckload quantities of bulk-granulated, liquid sugar, or blended sweeteners.

Both plants are equipped to make deliveries of bulk sugar in tote-bins, in newly designed bulk-granulated trucks, or by bulk rail cars. The Portland plant also delivers liquid sugar or blend by tank-truck or rail tank car.

Completely Instrumented

No other branch of the food industry is more highly mechanized or more completely instrumented in its processes than sugar refining. By this advanced engineering, refiners maintain a high standard of product qual-

(Turn to page 164)



COMPLETE PROCESS—Flour and sugars are weighed in scale hopper (A) and fed into bowl along with other ingredients. Batch is premixed in unit (B) and fed to holding tank (C) which supplies continuous mixer (D).

Continuous Mixer Triples Output

Delicate angel-cake batter produced at 1,000 lb. per hour. Premixed slurry is whipped to "stiff peak," increasing cake volume and reducing bake time

NICK B. MULLER and RAY VAUGHN
Vice-President and Production Superintendent, respectively, Muller-Grocers Baking Co., Grand Rapids, Mich.

Angel-food cake batter is mixed continuously at a rate of 1,000 lb. per hour—or three times the old batch rate at Muller-Grocers Baking Co., Grand Rapids, Mich. This is done by pumping a premixed slurry through an AMF Oakes mixer.

In this machine, a pronged disk turns at 400 rpm. between pronged stators to quickly whip the premix to a "stiff peak." This is a highly desirable condition that is impracticable with the conventional technique because the cakes lose volume or fall.

Another advantage gained by Muller-Grocers is that it takes less time to bake the continuously mixed cakes, a higher oven temperature being used.

In conventional practice, batter is mixed to the "wet peak" stage, and it contains only 40 percent of the final cake volume. The other 60 percent is developed during baking. But with the new method, the greatest percentage of volume is produced by mixing in the continuous unit.

Reducing and expanding nozzles prevent loss of volume as the batter is fed from the continuous mixer to the depositor. But the batter must be prepared cold to hold volume. If its temperature as it flows into the depositor exceeds 60 deg. F., the cakes coming out of the oven will lose volume. It is for this reason that partially defrosted eggs are used in the batter.

Premixing of the batter is carried out in a vertical 340-qt. Glen mixer. Flour and sugars, conveyed from storage by elevators and screw conveyors, are scaled into this mixer. Then water is metered into the bowl and other ingredients are added. The latter include salt, flavors, cream of tartar, and the partially defrosted eggs.

Premixed for 2 min., the 30-deg. F. batter is pumped into a 350-qt. capacity stainless steel non-refrigerated holding tank. While the premix is being pumped from the holding tank to the continuous mixer, another batch is prepared in the vertical blender. In this manner, there is an ample supply of slurry ready for the continuous mixer.

Temperature of the batter in the holding tank is about 35 deg. F., and it increases to approximately 40 deg. F. in the continuous mixer.

Batter is pumped under 100-psi. pressure into the continuous machine. But before it enters the mixing head, compressed air is introduced into the batter at a rate of 0.4 cfm. to develop volume, rate of air feed being controlled by a flow meter.

An automatic back-pressure regulator on the mixer remains closed until the pressure in the mixer builds up to 80 psi. Then the batter discharges into a 1¼-in. line, passes through a reducing nozzle that maintains the back pressure, and enters a ⅝-in. flexible hose. Then the batter passes through an expansion nozzle into a 40-ft., 1¼-in. pipeline that carries it to the depositor, at which point its specific gravity is 0.25 to 0.27.

At the depositor, the batter is automatically scaled into pans—10 oz. for ring-shaped items and 12 oz. for bar-shaped goods. Panned batter then continues to a traveling-type oven.

FROZEN BAGS of concentrate discharge from continuous belt after 20-min. travel through −40 deg. F. air blast. Product is still plastic at 0 to 5 deg. F. Six-cell carton for envelopes is seen at lower right.

Advances Flexible-Film Packaging With . . .

Frozen Concentrate in Bags

FRANK K. LAWLER
Editor, "Food Engineering"

Another stride in flexible-film packaging has been taken. It is marked by the efficient, big-scale packaging of frozen concentrated orange juice in 2½-oz. bags, or envelopes, at Pasco Packing Co., Dade City, Fla.

Developed to meet the wants of the Walgreen drug-store, soda-fountain chain, the new method exemplifies special food-processor service to institutional buyers. It opens the door to new market opportunities.

Packaged at a total cost only slightly higher than that for concentrate in conventional 6-oz. cans, the envelope-packed product has a future unlimited by special considerations. There is an important saving, in fact, when the expense of serving the product to customers is considered, making the package a contribution in economy as well as convenience.

Not quite as simple as it seems from these comments, the development has involved the solution of several problems. It all started in October, 1951, when Walgreen's vice-president, R. G. Schmitt, whispered into the ear of Pasco's technical director, E. R. Fehlberg, this secret: "*A better method of serving is all that stands in the way of using concentrate at the chain's food counters.*"

Then and there was the idea born that individual servings might be the answer.

So Pasco went to work. Concentrate packages were made experimentally from polyethylene drum liners. But these proved difficult to seal—too many leakers. And the film was permeable to oxygen, which is detrimental to orange-juice quality.

Materials and Machines

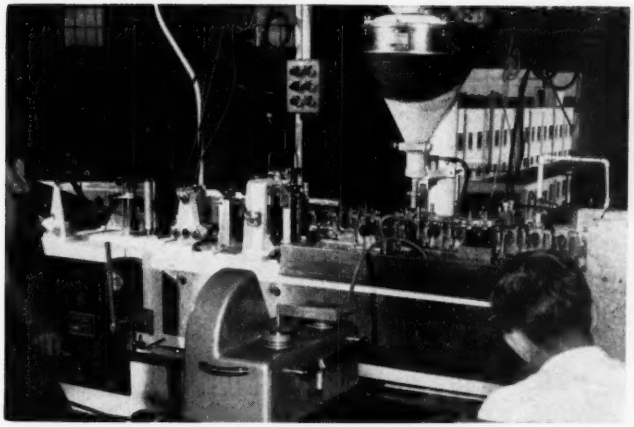
At this point, film suppliers and industrial laboratories came into the picture. Then the cellophane-polyethylene lamination of Standard Packaging Co. was selected. It offers low-temperature flexibility, low oxygen and essential-oil permeability, and resistance to low-temperature delamination.

Pasco currently is using a 300 MSAT cellophane laminated to 2-mil. polyethylene. There is indication, however, that 1½-mil. "poly" will do the trick, and it is being tried in commercial operations.

The cellophane is printed with Pasco's design in reverse rotogravure, then laminated to the other film. This not only prevents scuffing of the label in shipment, but protects the product from the ink.

This packaging material retains its flexibility and seal-holding ability at dry-ice temperature. Although this is a drastic requirement, "drop" shipments of the concentrate are made to small retail stores in dry ice.

Having found a satisfactory material, the next step was to select machines to efficiently form, fill, and seal the packages at high speeds. Pasco started out with a Bartelt unit and more recently has installed a second



ADVANCED horizontal-travel Bartelt unit forms envelopes from 11-in. film strip, then fills and seals. High-speed unit is easy to clean.

Opens new market with handy 2½-oz., single-serving envelope. High-performance film and advanced machines give low-cost, high-volume output

one incorporating advanced features that meet special requirements. Operating at a speed of 100 packages a minute (compared to 85 for the first unit), the new machine has all electrical controls on a remote panel. Noncorrosive stainless steel parts are used where possible. The unit has an improved one-shot lubrication system and more sensitive heat controls. And it can be steam-cleaned easily.

Built to "take it", the new Bartelt is geared to a daily production grind of more than 100,000 usable packages every 24 hr.

Using a roll of 11-in. wide film, the machine folds the film, heat seals the sides, cuts the formed envelope from the continuous strip, automatically fills it by volume while vacuum arms hold the walls apart, and heat seals the top.

The company also installed a new Model "BS" FMC Stokeswrap machine with two packaging heads. It is maintaining the fast pace of 100 packages a minute, and probably will be stepped up to 120.

First shown at the Packaging Exposition last April, this machine uses two rolls of film 2¾ in. wide, one printed and one plain, for each head. In forming the package, the machine edge-seals two film strips together around a tube, makes the bottom seal, cuts and fills the envelope, and seals the top, the printed design being registered photoelectrically.

The right amount of concentrate is injected from a specially designed adjustable-piston filler. The package is filled from the bottom up, then withdrawn from the filling nozzle to eliminate drip that would interfere with sealing.

The Stokeswrap also is made with noncorrosive or plated parts. And electric wiring, connections, switches, motor, and electric eye are waterproof to permit thorough steam cleaning.

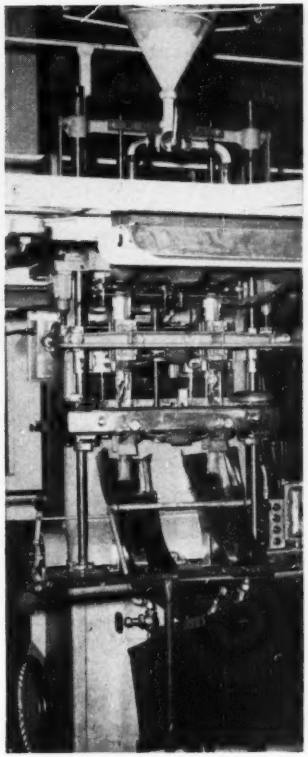
One of the major packaging problems has been the elimination of leakers. Any drip prevents proper sealing. Currently, the company is averaging approximately one leaker in a thousand, and has hopes of doing substantially better.

After freezing, leakers do not develop unless thawing occurs in transit. The only trouble of this type so far involved 56 leaking packages in a shipment of 1,800 cases of 72 bags each. And this was from a very early pack. Fewer leakers on thawing would be expected now.

Freezing and Packing

Coming to the packaging machines from Votators, the 42-deg. Brix concentrated juice is chilled to a 17-deg-F. slush. This condition minimizes splashing and filler-tube drip, and increases freezer capacity. And uniform temperature is essential to uniform "throw" of the volumetric fillers.

To permit year-around bag-packaging of the concentrate, enough is



NEW MODEL vertical-travel Stokeswrap former, filler, sealer—with two heads. It makes envelopes from two 2¾-in. film strips, is fast and quickly cleaned.

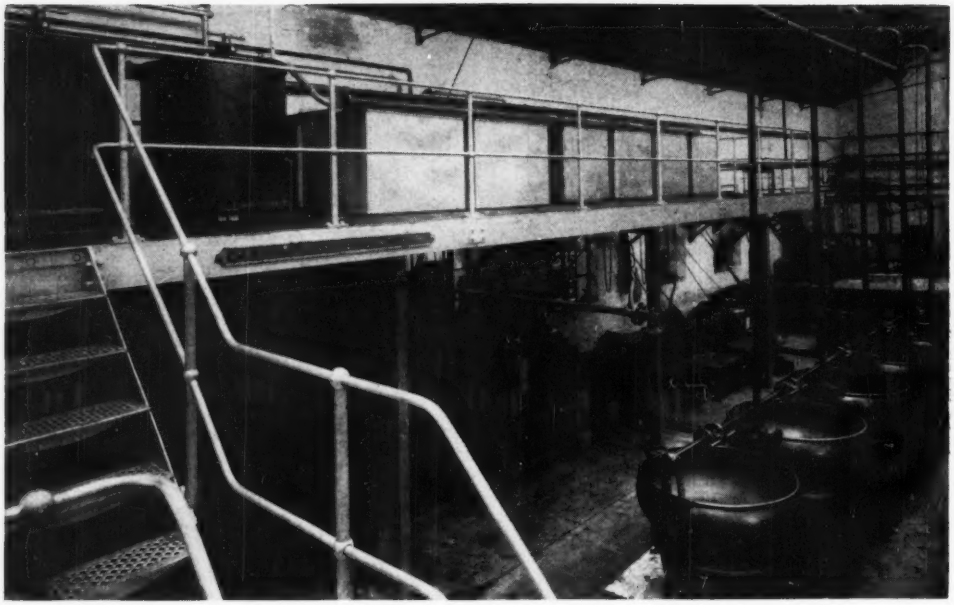
stored in bulk to carry through the off-season months. This bulk concentrate is thawed quickly, mixed in a surge tank, and slush frozen before packaging.

Leaving the packaging machines, the bags are rinsed with water spray and conveyed to the freezer, the conveyor "doubling in brass" as an inspection belt. Traveling through a −40 deg. F. air-blast freezer on an endless, 6-ft.-wide LaPorte metal mat with ¼-in. openings, the product is frozen in 20 min. At 0 to 5 deg. F., the frozen concentrate still is plastic.

The freezer belt discharges onto a collection table, and the 2¾x5¼-in. envelopes are packed into cartons by hand. After machine-sealing, the cartons are immediately conveyed to the −20 deg. F. warehouse, where they are stacked on pallets and stored 18-ft. high.

Pasco now is packing the concentrate into cartons with six cells, formed by three corrugated partitions.

(*Turn to page 209*)



BRITISH adhere to open-pan method. This typical modern jam-making plant comprises battery of kettles (right), syrup tanks (background), and automatic weighing-charging unit (below). (Photo: Wm. Brierly, Collier & Hartley, Ltd.)

When It Comes To Making Jams,

English build world reputation for quality jams and jellies on techniques, formulas, and

G. H. RAUCH
Margaretts Preserves, Ltd., London, England

Just how different are the jam- and jelly-making practices in the U. S. and Britain? And how different are the final products?

A broad, overall look at operations in both countries will point out variations in formulas, processing methods, and major characteristics of the finished products.

No attempt, however, will be made to evaluate production methods or to critically consider the respective standards for quality.

To be taken up in order are legal regulations, formulas, raw materials, and manufacturing methods.

Legal Regulations

In the U. S. and Britain, the manufacture of jams, jellies, and marmalade is governed by legal regulations and standards. It is interesting and revealing to compare the American federal specifications with the British food-standard order. At present, the latter is under review, and it is the subject of considerable controversy and deliberations.

It is unnecessary to enter into a detailed examination of these voluminous regulations, because even a perfunctory study of the underlying principles reveals an important difference between American and British jam manufacture.

The British statutory order stipulates that all jams, jellies, and marmalades must contain not less than 68.5 percent soluble solids, and must also comply to a schedule which enumerates in detail the minimum percentages of fruit in jam. This order applies to jam, jam mixtures, jellies, and marmalade, and varies, as far as the fruit content is concerned, between 20 and 40 percent.

For example, minimum percentages of fruit must be: Apricot, 40; raspberry, 25; black currant, 22; strawberry, 37.5; and marmalade, 20.

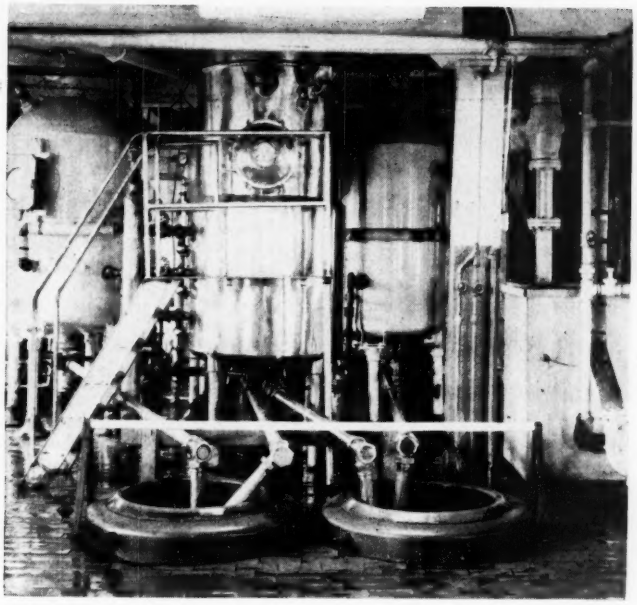
The schedule contains only minimum percentages, and as a rule, high-quality jams are manufactured to standards well above those laid down by statutory regulations.

British standards are mainly based on the percentage of soluble solids, which remain the constant factor for all varieties of jam. In comparison, the American federal specifications stipulate not less than 68 percent of soluble solids for jams scheduled under Group I, and not less than 65 percent of soluble solids for jams and jellies scheduled under Group II. American regulations lay emphasis on the fruit content—the constant factor for all types of jams, jellies, and marmalade—stipulating a minimum content of not less than 45 parts by weight of fruit to each 55 parts by weight saccharin ingredients.

Formula Comparisons

The following examples show a comparison of composition and yield of a typical American and British formula:

An American formula comprises:



AMERICANS lean toward vacuum-boiling practice, which retains volatile flavors and minimizes mashing of fruit. (Photo: Mojonnier Bros. Co.)

British Are Different

materials that vary in many ways from American practices

Sugar, 55 lb. of 100 percent soluble solids; fruit, 45 lb. of 10 percent soluble solids; and liquid-apple pectin, 5 lb. of 10 percent soluble solids. Pounds of soluble solids per batch amounts to 60. Desired soluble solids content should be 68 percent, and the theoretical yield is $6{,}000 \div 68 = 88.2$ lb.

A British formula consists of: Sugar, 66 lb. of 100 percent soluble solids; fruit, 40 lb. of 10 percent soluble solids; and liquid-apple pectin, 5 lb. of 10 percent soluble solids. There is a total of 70.5 lb. of soluble solids per batch. Desired soluble solids content should run 68.5 percent, and the theoretical yield is $7{,}050 \div 68.5 = 102.9$ lb.

Thus, British jams contain more sugar and less fruit.

Table I shows the composition of high-quality British jams, which are well above present statutory standards. For comparative purposes, typical American formulas of similar-quality jams and preserves are revealed in Table II.

The world reputation of British jams is vested in the selection and quality of the fruit. The moderate oceanic climate in Britain promotes slow maturing and particularly favors some soft fruit varieties, such as strawberries, raspberries, red currants, black currants, and blackberries, which attain unmatched perfection. Some of these varieties have been specially developed for jams.

Raw Materials

In addition to home-grown fruit, selected varieties are imported from Holland, Belgium, France, Australia, British Columbia, and Spain. Holland and Belgium supply black currants, strawberries, and raspberries. France furnishes black currants. Spain supplies the famous Seville orange, Murcia, and Valencia apricots.

It is difficult to draw a comparison with American fruit supplies and varieties. The vast territory of the U. S. and the great climatic differences, make generalizations of this nature impossible. It is, however, true that grading and general appearance of fruit is superior in the U. S., while the flavor and selection of fruit used for jam-making is better in Britain. This general statement only applies to soft fruit varieties.

A marked difference between American and English jam manufacture is in the preservation of fruit. In the U. S., the fruit is either fresh, frozen, or canned, while in Britain the majority of fruit is pulped and preserved with dilute SO_2 solution.

Preserved pulp contains approximately 1,500 to 2,000 ppm. of SO_2. This preservative is almost completely boiled out, as the British food regulations stipulate that finished jam must not contain more than 100 ppm. of residual SO_2.

In addition to jam produced from chemically preserved pulp, a considerable quantity is made either from fresh or canned pulp. The latter type of jam is sold at higher prices, labeled as "Fresh Fruit Standard." High-quality jam and products for export to the U. S. are made only from fresh fruit. The U. S. Food, Drug & Cosmetic Act does not permit a tolerance of SO_2—no matter how small the quantity.

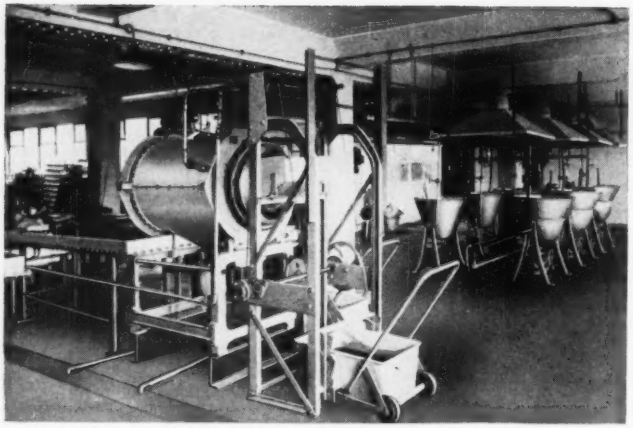
Both Use Invert

There is very little difference between American and British methods in the use of sugar. To obtain the correct balance of sucrose and invert sugar, a combination of both sugars in syrup form is being used. Also, sucrose is inverted during boiling by natural or added acids. Larger factories in Britain use elaborate sugar-melting plants, together with automatic weighing and discharging units.

American manufacturers use vacuum-boiling units where only little inversion occurs. So they have to add a certain quantity of inverted sugar to their batches to obtain the desired balance.

British jams differ from American in consistency. Most American jams would be termed "slack" in Britain. In contrast, the preference of the British public and trade users is for jam of firm consistency.

Since less fruit is generally used per batch in Britain than in the U. S., considerable quantities of pectin must be added. For this purpose, liquid-apple pectin is mainly used. This pectin is available in consistent quality and of excellent setting properties. Expressed as calcium pectate, it contains approximately 5 percent of pectin, and it is preserved with SO_2. Powdered citrus pectin is also used, but it is not quite as popular as the liquid-apple pectin. Handling of powdered pectin is more difficult, and



MEDIUM-SIZED British jam factory consists of kettles (background) and rotary jam-cooler (foreground). (Photo: The A.P.V., Ltd.)

the resulting set is usually tougher and less spreadable.

British and American manufacturing methods differ from each other considerably.

Processing Methods

British jam manufacturers adhere to the open-pan boiling process. Vacuum boiling has been entirely discarded. This is only partly due to the conservative attitude of British jam manufacturers.

The taste for jam is an acquired one. Vacuum-boiled jam tastes quite different from that cooked in open kettles. The main reason is probably the slight caramelization which invariably occurs when preparing jams by the open-kettle process.

It is claimed that volatile flavors are retained by the vacuum-boiling process, while the open-kettle method partly destroys the natural fruit flavors. Against this it may be argued that not all flavors retained by vacuum boiling are desirable. This seems to be particularly true in the case of preparing marmalade.

Questioned on this point, an American manufacturer suggested that not all flavors in an orange are good. And the bad flavors can only be lost by the higher temperatures employed in the open-kettle technique. It was also suggested that there was a tendency for vacuum-cooked marmalade to be "gritty."

Another important point. A good jam is a product in its own right, and it need not necessarily retain the natural fruit flavor. Fruit and sugars combine by high temperature to form a new product, with a flavor which is not necessarily related to that originally present in the fruit. For instance, the taste of orange marmalade is quite different from that of the bitter raw fruit. It is doubtful that this slightly caramelized flavor, so typical of English jams, can be attained at the low temperature used in vacuum-boiling pans. However this may be, the vacuum-boiling technique has a number of protagonists in the U. S., and constitutes a fundamental difference between the British and American methods.

Batch Sizes

Another important difference between American and British manufacturing methods is the size of the batch. U. S. processors mainly use riveted, steam-jacketed kettles with bottom outlets. These kettles hold 300 to 400 lb. In Britain, kettles generally have flanged and bolted joints. And the batches are considerably smaller, varying from 100 to 144 lb.

Some American manufacturers use stainless steel kettles, and boiling time is comparatively long for larger batches. In Britain, smaller batches are boiled faster, and copper kettles are preferred for their high heat conductivity. For boiling jams, stainless steel kettles are not popular in Britain, since they considerably increase the boiling time.

Some very popular British boiling kettles strike a happy compromise between the advantages of copper and stainless steel. The steam-jacketed portion of the kettle is of copper, giving all the advantages of the high conductivity of copper, while the top portion is built of stainless steel. The top part of the kettle is more difficult to clean, since the jam is in a greater state of agitation at this point, and it is here where greenish copper deposits are likely to form.

In general, excellent results are being achieved by both methods, and preference for either American or British jams is a matter of taste and custom.

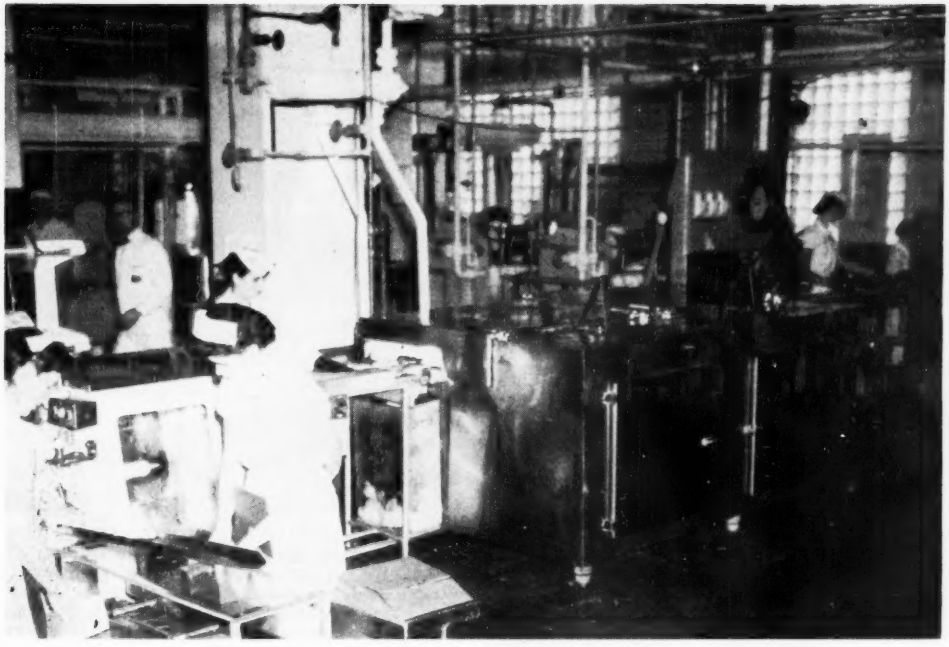
Quality Jam Formulas Compared

TABLE I—British Standard Formulas for High-Quality Jams To Be Boiled to 68.5 Percent Soluble Solids

Variety of Jam	Fresh Fruit (lb.)	Pectin (lb.)	Sugar (lb.)	Citric Acid (oz.)
Apricot	50	7.5	66	3
Blackberry	50	6.0	65	2
Black currant	50	3.0	66	...
Cherry	50	8.5	66	4
Damson	50	3.0	66	1
Gooseberry	50	3.0	66	1
Loganberry	50	5.0	66	...
Plum	50	6.5	65	1
Raspberry	50	6.5	65	1
Strawberry	50	7.0	66	1

TABLE II—Typical American Formulas for Fancy Jams and Preserves To Be Boiled to 69 Percent Soluble Solids

Variety	Fresh Fruit (lb.)	Pectin (lb.)	Sugar (lb.)	Citric Acid (oz.)
Apricot	65	7.0	65	6.5
Blackberry	65	5.5	65	4.5 to 5.0
Black currant	65	2.5	65	2.0 to 2.5
Cherry	65	8.5	65	4.5 to 5.0
Damson	65	2.5	65	2.0 to 2.5
Gooseberry	65	2.5	65	2.0 to 2.5
Loganberry	65	2.5	65	2.0 to 2.5
Plum	65	5.5	65	4.5 to 5.0
Raspberry	65	5.5	65	4.5 to 5.0
Strawberry	65	5.5	65	4.5 to 5.0



FASTER THAN 165 PER MIN. From tunnel (extreme right) frozen slices for Hood H-Bars move through enrober (center) where they are chocolate coated, next go to Rose wrapper (left). They are then packed 3-doz. to the box.

"Something borrowed, something new" . . .

Speeds Coated Ice Cream Bars

By modifying a candy machine, then combining it with new units on a continuous line, Boston dairy overcomes chocolate-coating difficulties, saves labor, too

ARTHUR V. GEMMILL
Associate Editor, "Food Engineering"

Production of chocolate-coated ice cream bars at faster than 165 per min. is a recent accomplishment of H. P. Hood & Sons, Boston.

In less than 30 min., the mix is converted to frozen bars, chocolate coated, wrapped, packed, and stored in the hardening room.

—All with labor reduced to a minimum by new automatic units and a machine ingeniously modified from another process.

And these are further benefits: Improved eating quality resulting from the quick freezing and absence of surface meltage . . . greater uniformity in bar sizes and coating thickness than heretofore . . . and lowered overall costs.

It took several years of planning, scouting, researching, and engineering to assemble and modify the units comprising this high-speed line. But success was immediate when production was launched last month, demonstrating it was all well worth it.

How It Began

Slightly more than a year ago, Hood imported several production units from England, where they had proved highly successful in the automatic making and wrapping of ice cream bars. These were set up in the Boston plant and used to manufacture a 2½-oz. portion of ice cream.

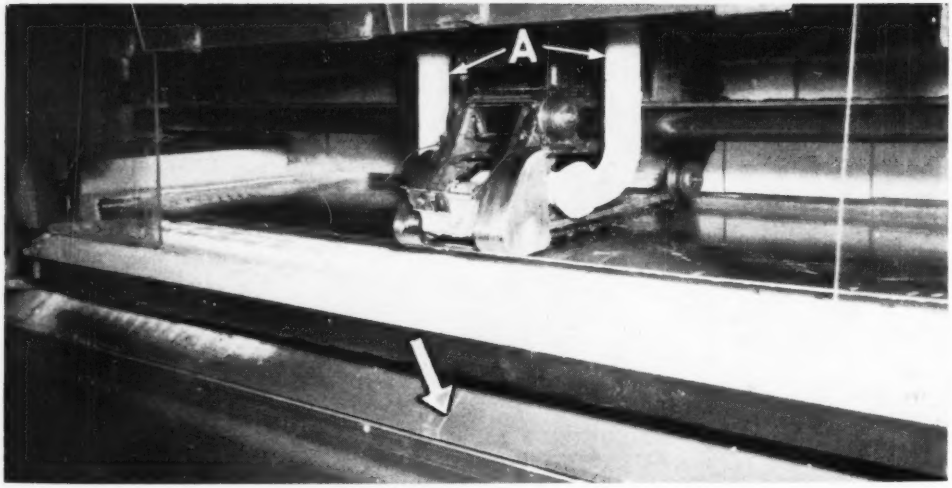
First of these machines, the Stonestreet unit, receives ice cream directly from continuous freezers, forms it into bars of desired size, quick freezes, then discharges them at 165 per min.

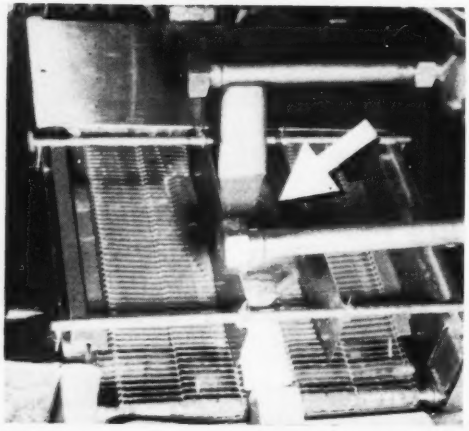
The frozen bars are conveyed directly to the second unit—a Rose wrapper. This machine, with a capacity of 200 per min., automatically wraps the bars in wax paper.

These units operated so successfully that the line was soon turning out 2½-oz., two-flavor, wrapped ice cream bars in excess of 800 doz. per hr., and with surprisingly little labor.

Based on this experience, company executives decided to go a step further and produce chocolate covered bars. Consequently, orders were placed for two additional units—another Stonestreet freezer and Rose wrapper. The executives assumed that a candy enrober could be easily modified so as to successfully apply the coating.

How H-Bars Are Made In Hood Plant



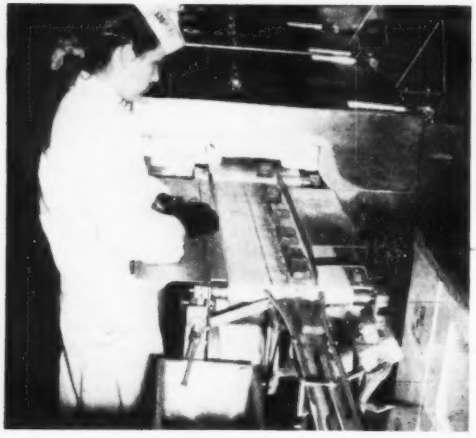


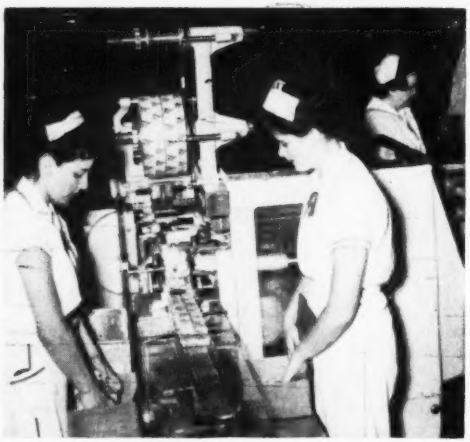
1 Above: Depositing head of Stonestreet unit (center) receives stiff ice cream from the 2-in. sanitary lines (A), forms it into individual slices and drops them in rows across 8-ft. belt that feeds into —35 deg. air-blast tunnel. When header reaches edge of belt its direction is reversed, and belt is moved forward to allow room for next row of slices. Hardened slices are removed from under side of belt and fall to transverse conveyor (arrow). Note hinged transparent covers that provide sanitary protection.

2 Left: Slices from Stonestreet unit move in single line to enrober where they are floated in melted chocolate (arrow). They then go to refrigerated tunnel where blast of 0-deg.-F. air quickly sets the coating.

3 Lower left: Bars are inspected as they move from refrigerated tunnel (background) to wrapper.

4 Below: Wrapping in wax paper (at up to 200 per min.) is followed by packing (3 doz. to box).





It was soon discovered, however, that ice cream presented many problems not encountered in the enrobing of candy. And it took many months of work on the part of J. W. Greer engineers and those of the Hood company to overcome these difficulties.

Major modifications finally incorporated in the Greer unit were: Floating of the frozen bars in melted coating, and addition of refrigeration to the 10-ft. long cooling tunnel to provide a temperature of approximately 0 deg. F. to quickly set the coating.

Having solved the enrobing problem, the complete line was put in operation several weeks ago. Now, 2½-oz. bars from the Stonestreet freezer move directly to the enrober, and from the refrigerated tunnel directly to the Rose wrapper. The wrapped bars are hand-packed (3 doz. to the box). Next unit automatically tapes the boxes, which move into the storage room.

It may be noted here that the newer H-Bar is comprised of ice milk coated with chocolate.

Present production at 165 per min. requires five women workers, along with one man to operate the two continuous freezers and the Stonestreet unit, and another man to supervise the remaining process.

How Units Operate

The Stonestreet unit is comprised of a −35 deg. F. air-blast tunnel, two 8 ft. wide by 32 ft. long belts, and an oscillating depositing head.

In operation, ice cream, frozen to an extremely stiff consistency in two 150-gal. Vogt freezers, is fed to the depositing head as it moves back and forth across the top of the unit. As the ice cream is extruded through a die in the header, equally spaced wires, carried on two chains, cut off slices, which are then deposited in a row across the 8 ft. belt (see photo top of opposite page).

When the depositing head reaches the edge of the belt, it trips a limit switch that causes the head to reverse its direction and, at the same time, actuates a thruster that moves the belt a short distance into the freezing tunnel. This is repeated each time the head makes a trip across the belt, causing the belt to make a complete revolution in 20 min.

One of the unique features of the Stonestreet unit is application of the characteristic of soft ice cream to freeze to the conveyor belt as a means of returning the bars to the front for unloading. In this way both the feed and discharge are on the same end, thus facilitating operations and cutting loss of refrigeration.

To reduce the tendency for the frozen slices to be loosened as the belt reverses direction at the back of freezing tunnel, a 11¾ in. hexagonal sprocket is used at this point. A second belt, operating in the opposite direction, is mounted directly below the freezing belt. Should a frozen slice fall from the under side of the top belt it will be moved to the front of the unit on this lower belt.

Enrobing Operation

Frozen slices are automatically removed from the top belt and drop onto a transverse belt that moves them to the enrober.

Maintaining a continuous flow of frozen product from the freezers to the moving depositing head necessitated installation of a number of special swivel joints in the 2-in. stainless steel piping that connects the units. These joints enable the piping to follow the oscillations of the head.

At the entrance to the enrober, slices leave the transverse belt and proceed on a wire belt. Here they are flooded with melted coating that actually lifts them from the belt. Then blasts of air, directed against the top and sides, remove the excess chocolate, which then passes through the wire belt to the 10-gal. reservoir below. Bottoming of the bars is done by another floating operation as they move to a second station on the wire belt. From here they discharge onto a rubber belt that conveys the coated bars through the 10-ft. refrigerated tunnel.

Coating is circulated continuously from the bottom of the reservoir to the flooding units. Its temperature is maintained at 85 deg. F. by means of the Greer tempering column through which it rises.

Level of chocolate in the reservoir is maintained by a float valve connected to a line through which melted chocolate is continuously circulated from a 2,000 gal. storage tank.

From the refrigerated tunnel the bars are conveyed to the Rose machine, where they are wrapped in wax paper. This unit discharges the wrapped coated bars onto a collator in an edgewise position that facilitates their removal and placement in cardboard boxes.

Boxes are closed by the filling operators and placed on another belt that moves them under the previously mentioned automatic taper, then into the storage room.

Sanitation Stressed

In the design and construction of units in this line, special stress was placed on sanitation.

As an example, the 15-ft.-long belt assemblies in the Stonestreet unit are easily removed for cleaning. They slide out and onto rollers mounted on pipe stands. Daily cleaning includes removal and thorough washing of these belts.

The stainless steel cover of the refrigerated tunnel on the enrober is hinged so it can be folded back, giving easy access to the belt and other parts of the unit.

EASE OF CLEANING equipment is demonstrated by this view of the enrober tunnel showing how insulated cover is raised to give access to belt.

MODERN BUILDING replaces five multi-floor units, was scientifically planned to fit process needs. Through functional design, processing costs were lowered. Engineering and construction were by The Austin Co.

How *1-Building* Efficiency Cured Old 5-Building Squeeze

And Saved Floor Space to Boot

Johnson wins over high costs and congestion with modern functional design which "wraps single plant around all processes"—thus breaking material bottlenecks, speeding output, cutting labor, and minimizing maintenance

IVAN C. MILLER
Assistant Editor, "Food Engineering"

When the H. A. Johnson Co., now located in the Brighton District, Boston, was faced with a vital need for new facilities for its rapidly expanding processing divisions, the No. 1 requirement was drastic reduction of overall materials-handling costs.

Another demand was that building layout must permit processing departments to function separately.

These and other problems were submitted for solution to The Austin Co., which first made a cooperative engineering study in order to "wrap a single plant around all processes so as to meet complete operating needs".

"Why" of New Building

Designing of the building, including specifying of the equipment, followed approval of the survey. Then the building was constructed, and equipment purchased and installed by Austin.

By adopting a specific design—one that was primarily functional, yet didn't sacrifice outside appearance—all problems were solved and processing requirements met.

Differences in construction between the old buildings and the new, strikingly reflect the advances in food plant design, indicating where and how operating costs were reduced and the advantages of planning a plant to fit production needs.

Necessity for the move to modern quarters was accentuated not only by the multiplicity of the company's enterprises but also by the fact that operations had spread over five separate buildings. Scanning the company's business range will help to bring its problems into perspective:

The organization functions both as manufacturer and distributor. It processes products for bakeries, confectioners, ice cream makers, and the fountain trade. In addition it fabricates equipment for the same groups.

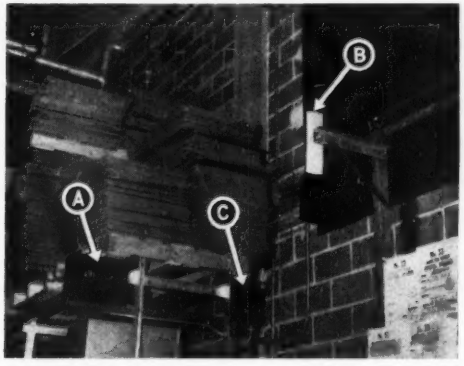
Distribution functions include warehousing and jobbing its own products as well as an extensive line of other food and ingredient supplies—and equipment, too.

Five "Moving Bottlenecks"

Three of the former buildings were eight-floor-and-basement structures, 120 ft. by 24 ft. Each was dependent on a freight elevator for materials. Likewise dependent were two other seven-story buildings of the same dimensions. In all, five buildings were used for operations, with frozen foods separately stored in public warehouses.

FORK TRUCK functions as elevator. Second floor door is raised and lowered when beam from "eye" control — (1) in photo—is interrupted by panel (2) on truck.

PALLETIZED PRODUCTS are stacked four tiers high by 167-in.-lift truck, upping storage capacity 25 percent.



ELECTRIC-EYE CONTROL uses reflected-beam principle. Longer operating range is obtained when light from sender (A) is reflected by mirror (B) to receiver (C).

Not only were the five elevators irritating bottlenecks, preventing free flow of products in and out of plants, but their operation and maintenance was excessively expensive.

In the new home, congestion points have vanished, and with them excessive materials-handling costs. Whereas 52 employees were formerly required just for the movement of materials, now an increased volume (more than 250 tons in and out per day) is easily handled by 31 employees. There has been a space saving, too, since operations are now handled in 5 percent less floor area.

Two Floor Plant—No Elevators

Food processing today requires but two floors. On the upper is manufacturing; on the lower filling and packing. These areas are in 84-ft. wide sections of the 402-ft. long building. Paralleling the manufacturing department is a 149 ft.-wide warehouse extending the length of the building.

Ingredients, such as sacked sugar and cocoa, coconut, vanilla beans, frozen foods, etc., must be delivered to the second floor processing area—but not by elevators, for there are none.

Instead, special fork trucks, with 162-in. lift, elevate supplies on pallets to the upper processing floor (except bulk sugar and syrups which are conveyed and pumped).

Entrance to the second floor is through three openings, each just large enough to admit loaded pallets. Second-floor workers' safety is assured by electric eye-controlled, fire door-type gates. These raise automatically, as fork trucks approach to deliver a loaded pallet or retrieve an empty, and close when the truck has backed away from the opening.

Mechanics of Gate Control

At first, door-opening controls were located near the floor on opposite sides of the approach. However, they were soon relocated. For workers frequently had to step from the traffic aisle into the recess to avoid fast moving trucks, thus momentarily breaking the beam actuating the door controls.

Repeated breaking and restoring of the beam placed too great a load on the electrical mechanism, which was designed for complete raising-and-lowering cycles. Fuses were blown constantly. Maintenance ran high.

This hurdle was cleared when beam controls were elevated well above workers' heads.

However, other problems were incurred. To actuate the elevated controls, a 6-in.-wide plywood panel was attached to the truck (width vertical) at beam level. And with this arrangement, the second-floor door was opened.

TANK TRUCK dumps bulk sugar in screw conveyor feeding elevator going to 100,000 lb.-capacity bin in plant.

by "eye"-beam by the time the load was ready to enter.

But when the pallet was in position to be unloaded from the forks, the rear end of the panel cleared the beam, allowing the door to drop too soon. And unfortunately, extending the beam-breaker to the rear interfered with other necessary truck services and maneuvers.

This last difficulty was overcome when sending and receiving controls were placed on the same side of the approach to the door, the beam from one to the other being reflected by a mirror located on the other side of the recess.

Since the same panel now interrupts the beam through a longer travel, the gate remains elevated until the truck forks have cleared the passageway.

Trucks v. Elevators

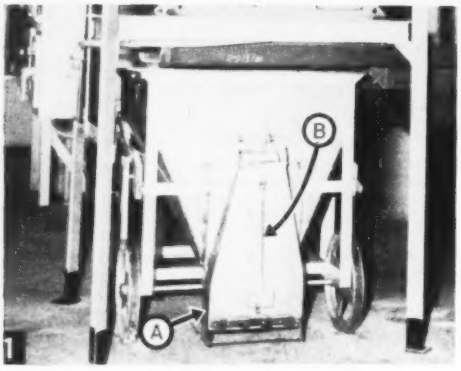
In addition to the operators who were needed to run the five elevators in the old buildings, a crew of workers were kept busy loading and unloading them.

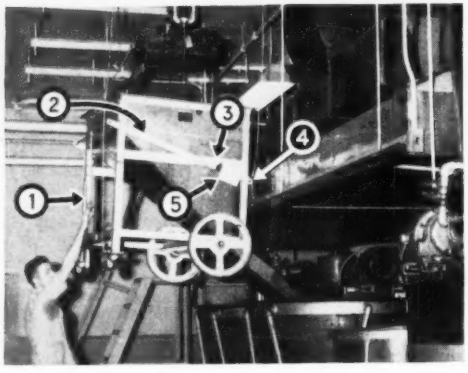
Now, however, supplies for a full day of manufacturing (except for the bulk sugar and syrup previously mentioned) can be handled by one high-lift truck in approximately 2½ hr. Furthermore, cost of operating and maintaining the trucks is small in comparison to that which was required by the five elevators.

Use of the company's three high-lift trucks is not confined to "pinch-hitting" as elevators. Because of their extended reach, palletized supplies, and also finished products of the manufacturing departments, can be stacked four tiers high. Thus, warehouse storage capacity is increased 25 percent.

Arriving at the plant in hydraulically tilted tank trucks, the bulk sugar is unloaded into a chute feeding a short screw conveyor that directly feeds a vertical bucket elevator. The discharge from the elevator is carried by means

Simple Devices Turn the Trick





1—Novel Mobile Bin Construction

Built to Johnson's specifications, sloped-bottom bins used for transporting bulk sugar from batch scale to kettles save labor and time.

Not only do they provide rapid product conveyance, but in addition they are equipped with special chute and valve which prevent splashing.

When not in use for discharging bin contents, the hinged chute—(A) in left photo above—is folded up to clear the floor. Raising and lowering is facilitated by the latch rod (B). When latch is disengaged, chute can be swung down to continue the slope of the bin bottom.

To empty contents after bin has been hoisted into dump position, operator pulls down on a grip-end rod—(1) in right photo above—to operate the outlet valve control lever (2). Latter, pivoted at (3) and having slotted end connection (4), lifts and lowers the slide valve. Lever counterbalance (5) closes the valve when operator releases control rod (1) after delivery.

Since the end of the chute can be lowered into the kettles and the flow of material controlled, splashing is prevented, sanitation improved, and clean-up minimized.

Another advantage is fact that other ingredients, such as cocoa, can be added in the bin for delivery.

2—Conveying With Troughless Screw

A bulk materials storage facility in 4 sections with partitions of descending height, and supplied by an open-flight screw conveyor brought these advantages at Johnson's:

1. Danger of over-filling any compartment has been minimized.
2. There is little chance of clogging or overloading distributing conveyor.
3. No watchful-eye of attendant is required during filling.
4. No sanitation problem is faced, since system is entirely enclosed.
5. Maintenance is negligible and operation cost low.

Bulk material from the feed elevator

of another screw conveyor traveling over the top of a 100,000 lb.-capacity storage bin in which the sugar is deposited in four bin compartments. (For details of the bin's construction and the numerous advantages inherent in the design, see Item 2 in accompanying special panel, "Simple Devices Turn the Trick.")

Transportation of bulk sugar from ground-floor storage to hoppers on the manufacturing floor is through a totally enclosed system of screw conveyors. Power required for the 150-ft. trip, including negotiating of two right-angle turns and elevating the sugar 20 ft., is but 12 hp.

Controlled Into Process

Each of the two manufacturing divisions has its own 2,000 lb.-capacity, high-low level-controlled hopper. When the level of the sugar in either of the hoppers falls below the low-level control, automatic operation of the conveyor provides a fresh supply to this hopper until the high-level limit is reached. Then controls break the circuit of the hopper-feed conveyor motor, stopping the flow to the filled unit.

When both hoppers are filled, controls operate relays to stop all motors on the conveyor system. And they start them again as soon as the sugar in either bin is down to the low-level control.

Discharge from the last of the conveyors delivering from bulk storage is via two chutes which form an inverted V, commonly called pants-leg chutes. Each of the latter supplies one of the hopper feeds.

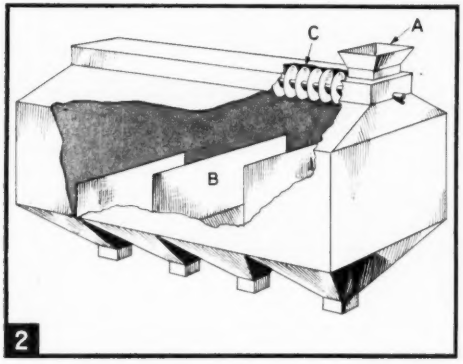
There is no need for valve, deflector, or cut-off—or operator attention—to control distribution at the chutes. While the screw-conveyor feeds of both bins are in operation, the flow to each is uniform. However, when one screw is idle, material flows into the conveyor only until the feed chute on that side is filled. From then on sugar is diverted to the conveyor in operation, and on to the hopper to be filled.

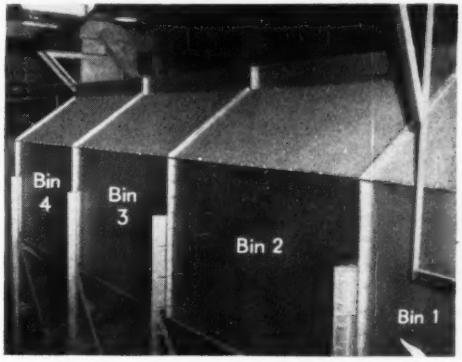
Discharge from the hoppers is by weight (40 to 400 lb. charges) via batch scale into specially designed tanks on hand lift trucks, or into mobile bin-trucks. In either case, the units are wheeled a few feet to a monorail conveyor and lifted by electric hoist. They are then transported to cooking kettles, further elevated, and dumped. Minimum labor is required for the operation. And in the case of the specially constructed bin-truck (see Item 1 in panel "Simple Devices Turn the Trick") delivery into the kettles can be carefully regulated and splashing thus avoided.

No Intermediate Liquid Storage

Corn syrup and refined sugar syrup are stored in bulk in four 8,000-gal tanks. These are separated from the

For Practical Ideas in Other Food Plants, See Pages 5-13





discharges directly into the first bin—(A) in sketch above—overflowing into second bin (B) when the level rises above partition height.

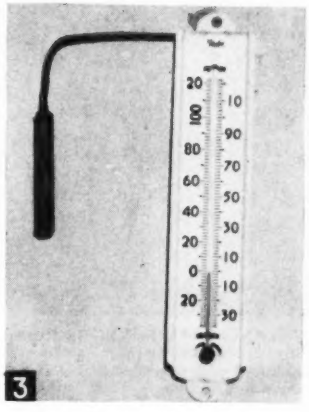
In time, the level in bin (A) reaches the open-flight screw-conveyor (C), which aided by overflow of each successive partition, advances the material to fill each bin. Since there is no trough below the screw conveyor, there's no clogging and scant chance of overfilling. Photo identifies bins.

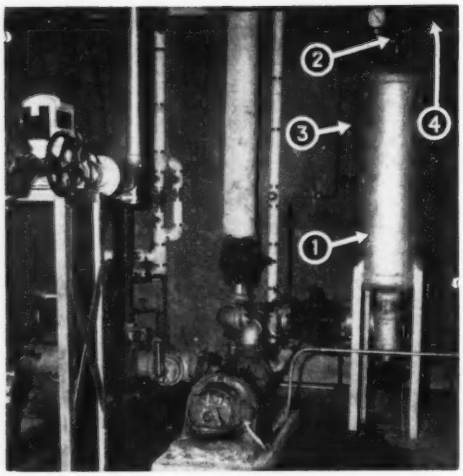
3—Control Bulb Ends Calls for Aid

Frequent worried phone calls by the night watchman to the Johnson plant engineer reporting, "Cold room compressors not running—what'll I do?" ended after a simple discovery.

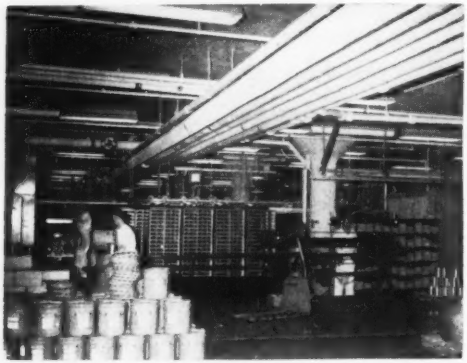
The watchman had noted that when the cold storage refrigeration compressors were running, their sound was audible in the refrigerated rooms where he periodically checked on storage room temperature. It was when the instrument-controlled compressors were silent that this conscientious worker phoned for help.

But then it was found that if he merely placed his warm hand on the thermostat bulb (photo right) at the time of checking temperature, the silent compressor would then start—unless it really had failed. Thus, the old anxious phoning is over and time and energy saved.

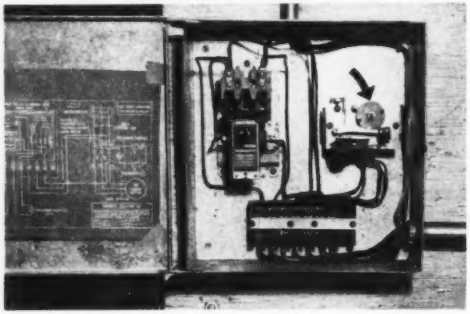




PUMPING UNIT eliminates intermediate storage. Syrup is delivered to tank (1) until pressure control (2) stops pump motor. Level, indicated on gage (3), is controlled by air pressure admitted to tank by valve (4).



PIPE LINES run length of plant under 1st-floor ceiling, with branches dropping to point-of-use on 1st floor or rising to equipment on floor above. Installation costs and pipe were thus saved, work space kept free.



TIME-CYCLE INSTRUMENT defrosts cooling-coils periodically. Timer (arrow) reverses flow of liquid Freon and hot gas for a scheduled interval, then restores normal flow after the defrosting.

rest of the plant in an underground room, kept warm year 'round by the heated coils in the corn syrup tanks.

From sub-basement, the viscous liquids are pumped through heavily insulated, steam tracer-heated lines direct to the point of use in processing departments. Though no intermediate storage is employed, syrups are available as needed merely by opening valves at kettles or product make-up stations.

Several advantages were gained by this functional layout. It thus was unnecessary to plan building space for intermediate syrup storage tanks, and accordingly purchase and installation costs of such units were avoided. Also skipped was the inconvenience and expense of holding their syrup content uniformly heated.

Merely by putting in a simple control device near the storage tanks, the above savings were made possible. Here are details on the device:

Connected into a syrup line, immediately beyond the pump is an instrument-controlled, vertical pressure-tank of approximately 80-gal. capacity. When all syrup-line valves in the processing departments are closed, syrup is pumped into this upright reservoir. Pressure is thereby built up sufficient to actuate a pressure control (80 lb. required) that interrupts the circuit to the pump motor.

Now, when a processing room valve is opened, syrup flows from the pressure vessel into the line until there is a drop to 60 lb. Then the control closes the motor circuit, again starting the pump.

Level of liquid in the pressure tank is indicated by a sight glass. Level desired at cut-off pressure is controlled by compressed air admitted through a manually operated valve at the tank top.

No Pipe-Line Clutter

Trunk lines for steam and all liquids start at the rear of the plant and in a group travel its length along the center of the first floor ceiling. Pipes supplying equipment or stations on either floor branch off from these trunks, either dropping directly to points of use on the first floor or going up through the ceiling to a processing unit or outlet on the floor above.

New manufacturing efficiency, as well as operating and installation economies, has been realized by this type overhead trunk-line installation.

Since feed lines to processing units are direct, a minimum of pipe and fittings is required. Work spaces are not cluttered with pipe, and the latter do not interfere with the overhead network of monorail conveyors. Furthermore, all pipe is accessible for repairs or for line extension.

The plant's ground floor level is at loading-dock height, and there is no basement under the plant. To run lines below the first floor level would have required a lengthy tunnel. This costly construction was avoided.

Time-Cycle Defrosting

Refrigeration requirements for processing are supplied by one 50-ton Freon compressor. Two others, with rating of 35 tons, maintain cold room and frozen food storage temperatures.

Since all refrigeration operations are fully automatic, compressors need not be located in the power plant for constant observation and care. Instead, they are stationed near the point of use. Thus construction costs are lower and operating labor is conserved.

Included in the automatic operation of cold-room refrigeration is cyclic defrosting. At the end of the fixed time period (which can be set at any interval between 1½ and 6 hr.), the blower motors of the unit coolers are stopped. As a result, cooler shutters, held open by the

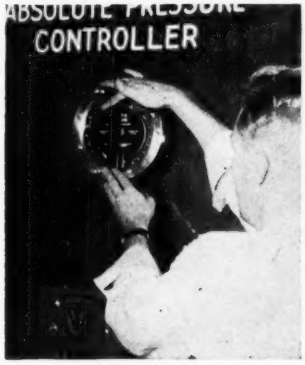
(*Turn to page 151*)

NEW PROCESS INSTRUMENTS

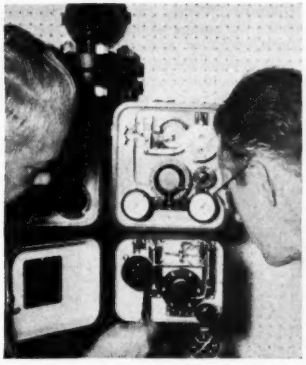
Twenty-three advances in "mechanical brains" shown at national exhibit of Instrument Society of America in Cleveland last month. Represent important contributions to advanced food-process engineering through improved control

CONTINUOUS LEVEL indicator introduced here by Fielden of Philadelphia has been used in England for dynamic readings of grain in bins, as well as for liquids. Long vertical probe senses capacity changes between vessel and material, actuates dial indicator. (87A)

MERCURYLESS manometer is basis of this new "dry" flowmeter offered by American Meter Co., Philadelphia. Employs one-piece, opposed, stainless steel bellows which transmits differential pressure through Teflon seal stuffing box to actuate full-scale recording pen. (87B)



ABSOLUTE-PRESSURE control unit shown by Wallace and Tiernan, Belleville, N. J., employs novel magnetic contact adjuster. It permits change of set-point without opening pressure-tight case. High and low contact points reset as knob and adjuster is turned. (87C)



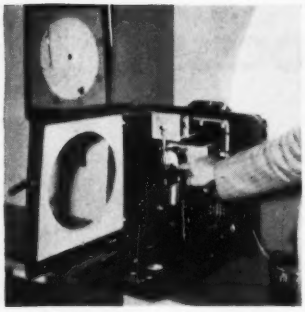
RESET ACTION is newly added function in Fisher Governor Co. (Marshaltown, Ia.) standard level controllers. Lower cabinet houses remote process-located receiver controller which is teamed with panel-mounted pneumatic transmitter. Reset brings set-point to original position. (87D)

ELECTROMAGNETIC flowmeter displayed by Vitro Corp. of America, New York, measures, by induction, flow in pipe of liquids having tap-water conductivity or higher. Accuracy claimed is 1 percent of full scale. Readings are unaffected by changes in liquid quality. Scale is linear. (87E)

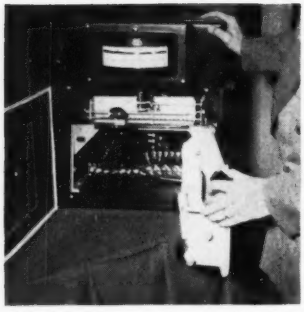
Want more information about any items in this picture article? Just circle key number (in parentheses at end of each caption) on the Reader Service coupon adjacent to the inside back cover.

Two More Pages of New Units →

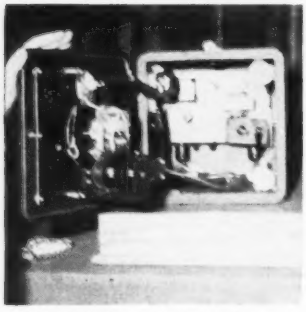
LOW-PRESSURE differential flowmeter displayed by Hays Corp., Michigan City, Ind., employs differential diaphragm and pilot contact before pen to achieve greater sensitivity. Can measure air and gas flow, or ratio of air to gas. Integrates every 30 seconds. (88A)



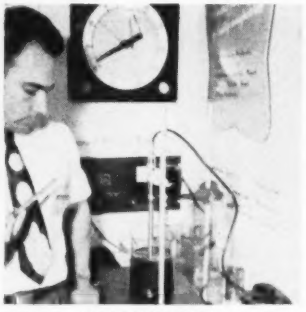
ELECTRONIC recorder-controller, of Fielden Instrument Corp., Philadelphia, converts galvanometer gaging of electrical variables into powered pen and control movement by vane follower and servo-motor. Case design, plug-in parts, and 2-tube circuit are innovations. (88B)



MULTIPOINT recorder displayed by Wheelco Co., Chicago, supplements "Capacilog" line with automatic printwheel attachment. It can provide 2, 3, or 6 single-color records. Printing occurs every 3 sec. Electric and pneumatic controls are available, states manufacturer. (88C)

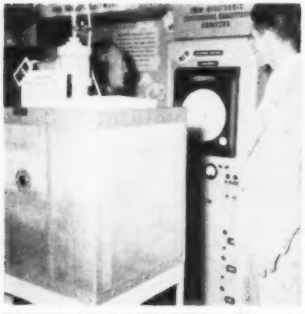


CONDUCTIVITY indicator shown by Industrial Instruments, Inc., Jersey City, N. J., fills gap between "blind" controller and large potentiometer unit. Employs built-in pilot valve to actuate pressure recorder. Has up to four positions of electric control; readable at 60 ft. (88D)

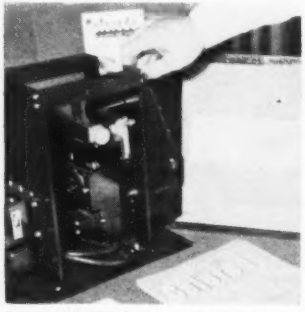


PROBE VISCOSIMETER, of Ultra-Visconson Corp., Hartford, Conn., senses by means of ultrasonic waves applied to tiny spatulate end. Electronic computer converts probe output into viscosity reading on recorder-controller. Unit has had initial success on tomato products. (88E)

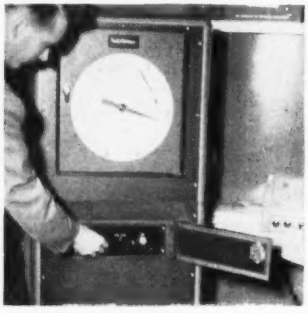
FIRE-DETECTING thermostat, shown by Fenwal Inc., Ashland, Mass., will provide signalling electrical contact when air temperature reaches danger point. Hermetically sealed in stainless steel, unit is only 4 in. long, fits any standard type of connection box. (88F)



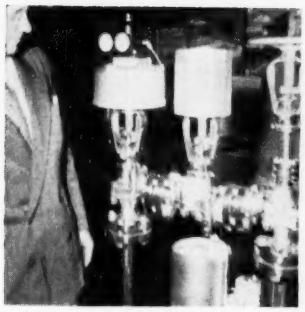
CONTINUOUS ANALYZER shown by Fischer & Porter, Hatboro, Pa., uses resonant frequency adsorption principle to provide quantitative measurement of consistency of solutions and slurries flowing directly in a pipe without external sampling chambers. Sensing unit at left. (88G)



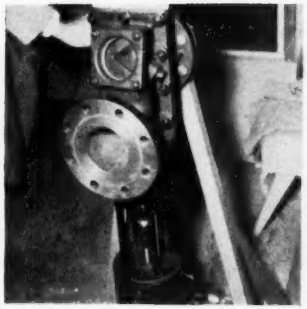
COLORIMETER for continous process measurement and control, was displayed by Instrument Development Laboratories, Needham Heights, Mass. Using the light-comparator principle, unit employs a photomultiplier, flicker photometer, and amplifier. Used on natural foodstuffs. (88H)



OXYGEN ANALYZER for in-stream process control was revealed by A. O. Beckman, Inc., South Pasadena, Calif. Accurate to 0.05 percent, it utilizes paramagnetic qualities of oxygen in measurement. Null-balance achieves ranges from 0-5 to 0-100 percent O_2. (88I)

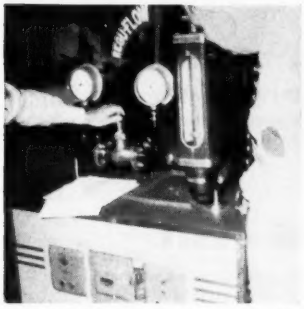


VALVE OPERATOR which employs sealed-in piston and integral null-type positioner are features of new Annin (Los Angeles) "Domotor" valve (left). Plug positioning is claimed accurate to 1/10,000 of valve travel. Working on 25-50-psi air, it handles 4,000 lb. maximum pressure. (89A)

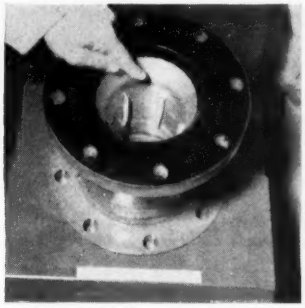


GATE VALVE employing V-type port which does not change shape was displayed by Fischer & Porter, Hatboro, Pa. Unit has no guides for seating, relies on pressure of liquid to secure gate in place. Tortuous path through body serves to make it self-cleaning. (89B)

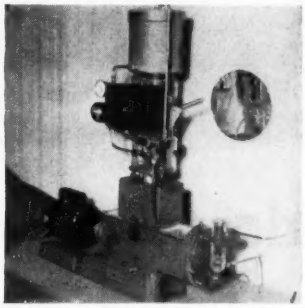
HYDRAULIC motor valve, actuated by standard electrical contact signals, was shown by Sarco Co., Inc., New York. Rotary pump forces oil into cylinder above valve piston, permits handling of pressures ranging up to 6,900 lb. in the 2-in. double-seated unit. (89C)



MANUAL-SET valve with calibrated adjusting knob permits highly accurate regulation of liquid-flow rates. Claimed accurate to within 3 percent with 10-100 lb. supply pressure variation. Available in ¾, 1½, and 2-in. sizes; maximum pressure 125 psi. Fulton Sylphon, Knoxville, Tenn. (89D)

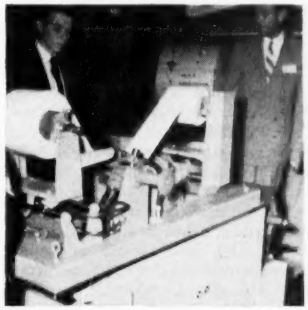


FLOW PICK UP employs two groups of oppositely pointing pressure nozzles inside tube. Nozzle groups are interconnected to common pressure rings which connect to high and low pressure sides of differential meter. Displayer was Foster Engineering Co., Union, N. J. (89E)

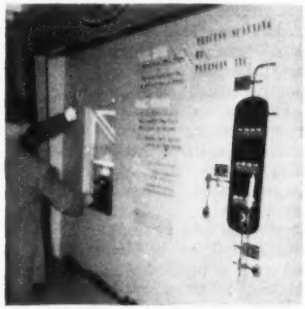


CONTROLLED PUMP displayed by Lapp Insulator Co., Leroy, N. J., provides highly accurate instrument-regulated metering of liquids into process. Unit has no stuffing box, fluid, or liquid seal; employs hydraulically actuated diaphragm. Capacities, 1.6 to 339 gph. (89F)

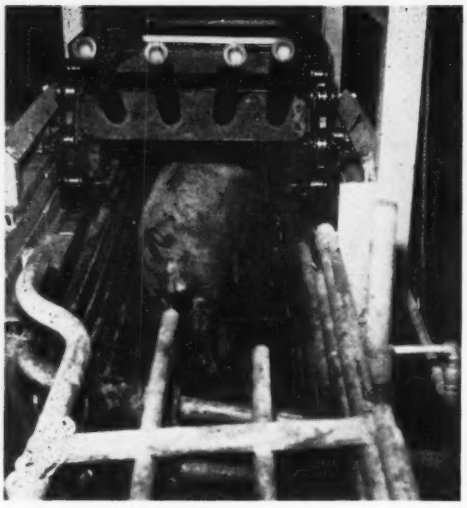
WEIGHING SYSTEM of Automatic Temperature Control, Philadelphia, utilizes hydraulic load cells (under lady's feet) to actuate pressure cells (front center) which electrically transmit to remote instrument. Accuracy claimed better than fraction of 1 percent. (89G)



POSITION controller displayed by Askanai Regulator Co., Chicago, picks up deviations in moving edge of strip of material by variations in jetted air stream. It automatically positions feed roll for uniform locations in a process. Seen especially adaptable in food packaging. (89H)

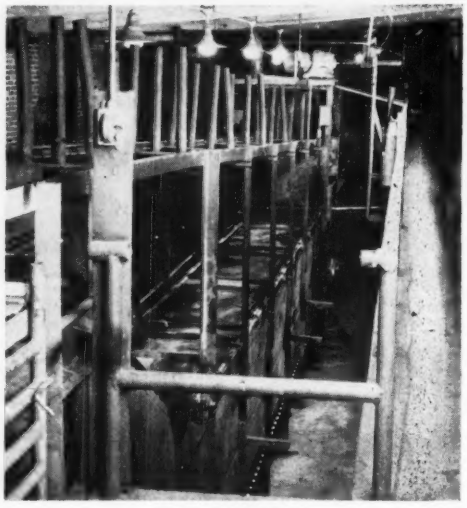


SCANNING system created by Panascan Inc., Chicago., will automatically survey readings of hundreds of remotely located variables in minutes. Indicating lights, meters, and counters on central panel are stated to permit speedy and accurate point identification and analysis. (89I)



From hog pen . . .

SINGLE FILE. hogs go through air-operated gate (front) to tunnel entrance. Note chain-driven rubber prods (top).



. . . to immobilizer . . .

NARROW building houses anesthetizing tunnel. It's set below floor level to retain heavier-than-air CO_2 gas.

Hormel Perfects *Painless* Kill

"Sleep tunnel" serves up peaceful, immobile hogs on continuous, waist-level conveyor, thus simplifying shackling and sticking. New technique smooths production, improves blood recovery and its quality

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

A spectacular development in Geo. A. Hormel Co.'s kill-room has replaced typical din and disorder with the efficient quiet and purpose of a surgeon's operating theater.

This medical analogy is not mere coincidence. For the company's new technique is based on surgery's most valuable tool–anesthesia. Employed is a continuous "immobilizing" chamber in which livestock is "put to sleep" with CO_2 gas prior to sticking, thus permitting belt-level shackling and quiet, controlled bleeding of each subdued, railborne animal.

While the immobilizing method was primarily developed to ease the toughest and most violent unit operation in food manufacturing, it has several additional benefits marking it as a major advance in meat processing. For after several months' experience with the new system on one-half of its Austin, Minn., hog kill, the company points to these extra features:

- **Immobilizing greatly diminishes animal fatigue, and thus assures top quality meats.**
- **Enables more accurate sticking, and cuts down dirt and spattering.**
- **Increases animal respiration and thereby raises blood recovery.**
- **Permits uniform rail speed in pace with other plant operations.**

Before delving into the theory that led to the new way and the engineering problems involved, it might be well to first draw a visual–and auditory–comparison between the conventional and new systems:

In most plants today, hogs are driven up a long ramp to a shackling pen. Here, two strong-armed men perform the hectic job of attaching a chain to a rear leg of each animal. The shackled hog is then hoisted onto an overhead rail that carries the wriggling animal through a sticking and bleeding area, where the highly accurate incision is made to sever an artery deep in its throat.

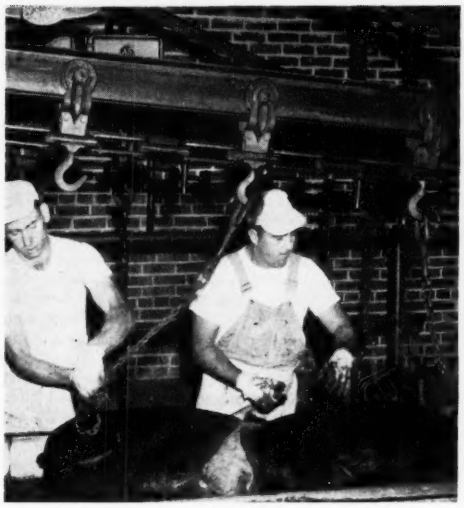
Because of the long climb and active struggling in pen and on rail, this system highly excites and greatly fatigues the animals. Furthermore, because of violent movement, accurate sticking is extremely difficult and uncontrolled blood spattering and animal excreta make a tidy operation virtually impossible.

Add to all this the din–those "squeals" that defy salvaging–and it is easy to understand why work in this area has always been for the strong-stomached and persevering.

Conserving the Squeal

Today, the last step in hog utilization has been taken–the "squeal is conserved" in the new Austin kill room. For nary an animal noise is heard as white-shirted attendants–minus their traditionally protective

Out of Disorder



. . . to rail . . .

LEAVING tunnel, belt-borne hogs now docilely submit to shackling. They're then hung-off at smooth speed.

. . . to sticker . . .

UNHARRIED sticking transforms messy, violent job into precise, controlled operation. Note unsplattered worker.

full-length aprons and hip boots—handle each calmly sleeping animal with little fuss and no furor.

We will start at the stock pens to visualize complete hog movement in the new setup. A long single-story brick building houses the immobilizer and bleeding area. This, in turn, feeds a long inclined and enclosed tiled ramp by which railborne carcasses are delivered to fourth-floor processing operations in the main plant.

An automatic chain-driven paddle-sweep moves the livestock from an entry pen into a feed-in area which is at right angles to the start of the immobilizer proper. Here, an attendant wielding a low-voltage electric probe routes the animals into a metal-bar enclosed lane. At the end of this lane—which can accommodate several hogs—another man operates a pneumatically driven, rubber-lined gate that spaces the hogs into the system. The same attendant uses an electric probe to keep movement continuous.

When a hog comes through the pneumatic gate, an endless-chain prodding convevor moves it along into the immobilizer. This convevor employs rubber-covered "nudging" bars. Each group of four bars is spaced a bit more than hog-length.

The animal then travels down an incline into a 30-in. wide, 32-in. high, and 53 ft. long tunnel, which is completely full of CO_2 gas. Concentration and pressure of the gas is fixed. No air-lock is needed, of course, since this gas is heavier than air.

"Sleeping Beauties"

In a matter of seconds, the incoming animal goes "under" in the tunnel and settles down on the stainless steel conveyor which runs its full length. Completely immobilized, the hogs emerge from the tunnel's delivery incline like "sleeping beauties."

At waist-level, belt-borne hogs then pass by two attendants who methodically and easily shackle each animal. A special turntable, designed by the company, routes the endless loop rail-chain around the shackling area.

The chained hogs, rail-suspended, then pass by the sticker, who performs his job on the inert animal with the unharried skill of a surgeon. Instantaneous and copious bleeding follows during the few feet the animal travels from sticking and on up the trough leading to delivery ramp.

The quiet and order in the bleeding area is quite astonishing to an unprepared visitor. The animal does not regain articulation prior to or after sticking, and it throws blood over a limited floor area, with very little, if any, splattering of the attendants. Only a few small spasms during passage up the exit incline indicate the shackled animals are still alive.

Several years of research and practical engineering went into the ultimate design and operating principle of the anesthetizing system. For one thing, the proper type and dosage of gas had to be determined, as well as its toxicity and commercial availability.

Immobilizer Details

From various materials tried (nitrous oxide, nitrogen, and carbon monoxide were among those studied), carbon dioxide was chosen in view of generation economy and physiological effects. The Pure Carbonic Co., a division of Air Reduction Co., Inc., then collaborated in engineering a suitable generating and distributing system for the installation.

Carbon dioxide is supplied to the immobilizer from a standard Pure Carbonic generator—very similar to those producing this gas in carbonated-beverage plants. At Austin, the equipment consists of two 2-ton converter-receiver tanks which are charged, in sequence, with 4,000 lb. of dry ice. Steam coils, built into the tank walls, supply heat to convert the solid to gas by sublimation. Refrigeration, from Freon circulated by a ¾ hp. Copeland compressor, prevents internal pressure in the generator from exceeding 300 lb.

There is no loss in conversion.

Each pound of dry ice produces a pound of gas (which occupies 8.6 cu. ft. at 70 deg. F. under atmospheric pressure).

Gas is drawn from the generator via a master valve through a pressure regulator and then gaged by a Fischer & Porter indicating rotameter which controls flow through a 3-in. pipe leading to the tunnel.

A vented pipe spreader, suspended at the top and center by a tee and running full length inside the tunnel, uniformly distributes the gas. Gas concentration is measured by a Ranarex meter (calibrated directly in percent CO_2) mounted on the wall inside the glassed-in generating room. This instrument automatically maintains the desired concentration—about 60-65 percent—through a solenoid valve in the gas line. Rubber leads and associated valves permit gas sampling at six points along the tunnel.

Extensive clinical studies were made by physiologists and chemists to determine the effect of varied gases and their dosage. Carbon dioxide appeared most satisfactory, inasmuch as it forms unstable non-toxic compounds with hemoglobin and permits rapid animal recovery in normal atmosphere. Furthermore, it increases respiration and blood pressure, which stimulate the rate of bleeding. And it has been noted to increase blood yield after sticking.

On the other hand, ether and chloroform—normal medical anesthetics—block the blood's ability to pick up and transfer oxygen and thus cut down on needed respiration. And carbon monoxide forms stable compounds with hemoglobin and causes death and a change in meat color.

In determining gas-dose concentration and time of treatment, varied effects were noted with different animals. Cattle, for example, required about the same dosage as hogs to produce a desired immobility of 15 to 25 sec. Sheep needed an appreciably smaller dose. In all post-mortems, absolutely no damage to the animal was demonstrated by the technique. And blood tests for glucose indicated a marked decrease in fatigue effect as compared to normal slaughtering.

Crowning evidence of success was approval of the method by the Bureau of Animal Industry, which permitted use of the process early this year.

While the new system has splendidly coped with its primary aim of easing and simplifying tough jobs in the kill-room by waist-level shackling and "inert" sticking, other factors have won the support of attendants in this area. Due to uniform delivery of hogs, the sticker can now work steadily rather than having to hurriedly handle batches. Thus, a rail speed of 3,700 hogs per hour was formerly necessary to keep up the kill, whereas the new system handles an animal on every other shackle at a 1,200-per-hour rail speed.

Another benefit is the system's ability to handle animals weighing 50 to 800 lb. In fact, its flexibility permits the steady run of any desired low number of livestock on up to as many as 720 hogs per hour.

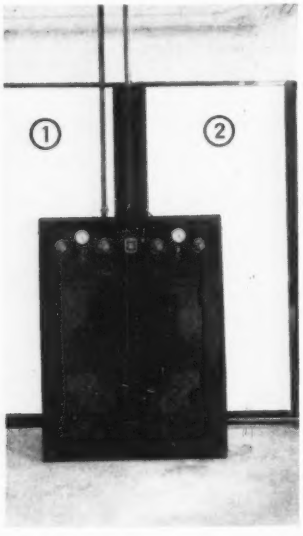
Further success of the new method is its ability to produce better and more complete bleeding as attested by much less blood in the scalding tank and cleaner blood from the dryer. In addition, there has been an appreciable reduction in bloody trimmings due to precision sticking.

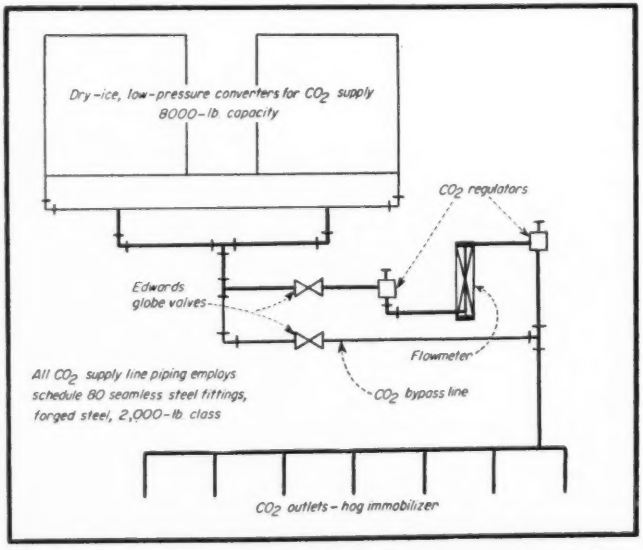
Cost of operating and maintaining the immobilizer is almost negligible. Actual cost of CO_2 per hog is a fraction of a cent. A continuous, built-in hot-water spray at the feed-end of the tunnel's apron-conveyor keeps the unit clean while running. And the entire assembly is washed down each night by one man, wielding a high-pressure water spray.

Lifting of the carcasses to the fourth floor—a route formerly climbed by live animals—is accomplished by a 20 hp. motor on the chain drive at a cost of only $0.15 per hour.

The revolutionary new system is the result of a number of years of painstaking work by Hormel's technical research department under the direction of L. W. Murphy. Most of the equipment was company wide.

U. S. Patent 2,526,037 was issued for the process in October, 1950. Subsequent perfection of equipment resulted in another patent application, now pending. When all its facilities are fully equipped with the new system, the company plans to make it available to other meat packers.




Dry-ice, low-pressure converters for CO_2 supply
8000-lb. capacity
CO_2 regulators
Edwards globe valves
Flowmeter
All CO_2 supply line piping employs schedule 80 seamless steel fittings, forged steel, 2,000-lb. class
CO_2 bypass line
CO_2 outlets—hog immobilizer

GAS GENERATING system. Photo: Twin 2-ton dry-ice converters. Cage (front) houses compressor and steam piping. Rate and pressure of gas are automatically controlled. Diagram: Layout of gas piping to immobilizing tunnel.

You're right, these are not plant accidents

But they can cost your company plenty just the same

SAFETY AFTER 5 O'CLOCK

Off-the-job accidents cause absenteeism—sometimes permanent—and boost your company's insurance costs. Family injuries worry workers, make them accident-prone in the plant . . . Here's a practical program aimed to curb such losses

ARTHUR S. JOHNSON
Vice-President, Engineering Department,
American Mutual Liability Insurance Co., Boston.

It is not surprising that industry has begun to look at off-the-job accidents as a major production hazard. Nor that industrial safety teams accept this problem as a challenge.

Not only do accidents away from work cause untold personal suffering and loss, but they are costly to employers. They take trained employees off the job—sometimes permanently. When they hit a worker's family, the result often is a worried and absent-minded worker who himself is liable to injury on the job. And the cost of group insurance is affected.

Reports one large manufacturer: "In six years—representing 196 million factory man-hours—we have had no industrial fatalities. In the same six years, 22 employees have been killed in off-the-job accidents."

Seven of these fatalities were skilled workers, seven others were semi-skilled.

Another industrial firm says: "From records of occupational and non-occupational accidents for the past 3½ years, we have found that for every plant accident, our employees have sustained 2½ to 3 off-the-job accidents."

No wonder that management wants to do something about accidents at home, on the highway, or elsewhere away from work.

There is a current movement to spread the cost of illness and to restore off-the-job accident victims to gainful occupation through the principles of insurance. But insurance is no substitute for preventing accidents. There is considerably more incentive for employer sponsored and directed accident-prevention activity than the question of cost reduction. Accident prevention to save life and avoid suffering needs no further incentive.

In addition to the obvious losses that off-the-job accidents bring to industry and to workers and their families, there are three others of considerable importance.

Because he is worried and distracted by an accident to some member of his family, a worker may fail to do his job safely. Casualty insurance companies' reports disclose many such instances.

Take the case of the worker who lost the second and third fingers of her left hand. Worrying about her husband, who had been injured in an automobile accident and was developing into a mental case, she neglected to use the safety guard on her machine.

Another case: An employee in a

nationally known baking company lost his arm when it became caught between the belt and the roller of a moving convevor. Experienced on maintenance and repairs, he had stopped the unit when it had begun to run unevenly and was adjusting the stitching on the belt. But then he had called to a fellow worker to move the belt forward—while his arm was still between the belt and the roller.

Investigation disclosed that this victim's wife had been taken to the hospital that same day because of a serious accident. The man said that he had been worried about her condition and probably shouldn't have come to work at all.

Still another: In an Eastern company, a woman operating a pie-dough rolling machine suffered a severe injury when her arm was caught in the roller. And since she had more than 18 years of experience on this job, the investigators had difficulty in understanding how she had come to suffer an unsafe-practice injury.

Then it was learned that her son had been found guilty in a highway accident and was that very day on his way to prison. She admitted to being so concerned over it that she wasn't thinking about what she was doing.

Raises Absenteeism

Another cost is absenteeism, the fact being that off-the-job accidents cause considerably more days of involuntary absence from work than do accidents in the factory. This is inherent in the statistical relationship between off-the-job and on-the-job accident disabilities.

Absenteeism costs employers on the average $56 a year for each worker. And total cost of absenteeism to the American economy is more than $34 billion annually.

Specific examples serve to illustrate: A large New York food processor, employing more than 2,000 people, analyzed its records and discovered that major off-the-job accidents had resulted in 305 days of lost time in the year 1951. Here, there had been accounted only those off-the-job accidents which had entailed lost-time periods in excess of seven days. Undoubtedly, those involving less than seven days' absence would have notably zoomed the total.

And an Indiana starch company, with a payroll numbering slightly more than 500, had a total of 114 days of lost time in 1951 because of off-the-job accidents. These represented "out" time in excess of four days.

Another off-the-job accident loss is strictly in the field of dollars-and-cents economy, but nevertheless does add up. In brief, group-insurance premiums are running higher, on the average, than workmen's compensation costs. Therefore, cost-conscience management should have a strong interest in keeping group-insurance losses under the best possible control.

Seven Basic Premises

So industry is looking for means of effectively promoting off-the-job safety.

To make any program of this nature work properly, management must take an active and enthusiastic interest in it. Unquestionably, one of the biggest factors in the control of on-the-job accidents has been management leadership in organizing and coordinating plans. And off-the-job safety can become a simple carry-over of this influence through expansion of such safety programs simply and directly into the field of vision of both the worker and his family.

Specifically, there are seven premises upon which an off-the-job safety program should be founded:

1. *The purpose and plan must be a serious objective of management, not the casual operation that now marks many safety programs.*

2. There must be intelligent and experienced direction behind the program.

Because many dangers are involved in invasion of the sanctity and privacy of the home, management may choose to act only in an advisory capacity. This to the extent of providing inspiration, suggestions, personnel, materials, and funds.

For control and direction under such circumstances, best results may be achieved by having an employee safety committee conduct the program.

Where management elects to exercise control, the off-the-job program can be an integral part of the in-the-plant safety authority, with responsibility assigned to the safety director, the safety committee, and the members of the foremen group.

Whatever method for control and direction may be followed, it must never be forgotten that participation in such a program is always on a voluntary basis.

3. *Continuity and regularity of effort is essential. Too often, efforts to prevent off-the-job accidents are sporadic and not part of a continuous plan.*

4. Employee interest must be created in the subject. Of itself, safety is essentially dull and not news. Only accidents make the front page. Yet safety can be made interesting. This is the greatest challenge to employer ingenuity.

5. *The program must provide a never-ending supply of show-how and know-how. The admonition "don't get hurt" is a waste of breath. "Do it this way" is a good beginning. Rehearsal to become letter-perfect and action-perfect is not too much.*

6. Every possible means must be employed to interest the family group in doing the things that will make the home safer for living.

7. *Some method of orderly investigation of home accidents is a must. Safety programs must not be theoretical. They must be based on fact, and apply to each plant's specific problem.*

Needed Material Available

To serve this broad purpose and meet these specifications, an off-the-job safety program has been devised by our company. It involves nine basic parts:

1. To give the program an official standing and to make the company's interest in it known: A letter has been designed for mailing to each family. It states conditions that make such a program important and outlines plans to help the family live safer lives.

2. To arouse interest in the subject of safer living at home: A special audience-participation quiz program for safety meetings has been developed. This is devoted entirely to off-the-job safety, both highway and home. This meeting program is intended to show: (A) That safety must be a matter of knowing how; (B) that safety can be interesting and productive.

3. To help the family make its home safe for living: A special home-safety check-chart has been designed.

4. To teach people how to live safely: A special safety show-how publication is published twice a year. Through pictures and words, it emphasizes the practices that make for safer living, describes how to handle emergencies, and provides first aid and health information.

5. To provide even more detailed information on specific hazards: Subjects are treated in individual booklets. Typical are: "Ladders, Their Safe Use"; "Fire at Night and How To Prevent Its Becoming a Tragedy"; "Splinters and Infections"; and Dangers of Unsupervised Use of Antibiotics".

6. To maintain on-the-job interest in off-the-job safety: Home- and highway-safety posters have been designed for plant bulletin boards.

7. To bring all phases of the program consistently to the attention of employees: Employee house magazines should devote considerable space to the overall plan, and they should regularly present safety show-how in-

(Turn to page 207)

KEEPING QUALITY of candies is influenced by the protection they receive during storage. Important are the use of moistureproof packages, agents inhibiting rancidity, and moisture-retaining ingredients.

Extending Candy Shelf-Life

Quality of confections is retained over a longer period by using suitable packaging materials, antioxidants, humectants, and adequate refrigeration

E. K. HEATON and J. G. WOODROOF

Georgia Experiment Station, Experiment, Ga.

Confectioners should extend the shelf-life of candies to meet new opportunities and demands. Since candies are consumed irregularly the year 'round, production is interrupted unless some stockpiling is carried out.

Agricultural products that go into candies are seasonal and require storage under carefully controlled conditions to maintain uniform quality. Candies are a favorite component of military rations, but must stand up for a long time and under adverse conditions. Thousands of pounds of candies are annually picked up from retail outlets because of quality deterioration—much of which might be avoided.

A research project was undertaken in which 42 varieties of candies were packaged in three lots of set-up paper cartons with telescopic lids. Each carton contained 1¼ lb. of candy. One lot of cartons was not wrapped, while another was overwrapped with waxed paper and the other with aluminum foil. Heat-sealable, moisture-vaporproof waxed paper and laminated foil (Rayseal No. 050) were used.

These three lots were then stored at 32 deg. F. and 55 percent relative humidity, 70 deg. F. and 60 percent relative humidity, and 70 deg. F. for three weeks, alternating with 100 deg. F. for one week.

Most of the candies were made according to Quartermaster Corps specifications, but with modifications. Among these confections were five containing 0.01 to 0.013 percent antioxidant (Tenox II), made up of 20 percent butylated hydroxyanisole (BHA), 6 percent propyl gallate, 4 percent citric acid, and 70 percent propylene glycol. The same candies without the antioxidant were included.

Carton Overwraps and Refrigeration Help Keep Candies Longer

TABLE I—NEED for Carton Overwrap is Influenced by Type of Candy.

Type	Overwrap	Organoleptic Score* Initial	Organoleptic Score* After Storage**	Moisture Content (Percent) Initial	Moisture Content (Percent) After Storage**
Peanut block	Plain	7.4	5.5	3.00	5.08
	Waxed paper	...	5.9	.....	3.57
	Foil	...	6.1	.....	3.30
Spun-peanut butter bars	Plain	8.0	6.9	3.53	4.57
	Waxed paper	...	6.9	.....	3.93
	Foil	...	7.2	.....	3.86
Pan-coated peanuts	Plain	8.6	7.1	4.32	3.55
	Waxed paper	...	6.8	.....	2.92
	Foil	...	7.4	.....	1.95
Candy corn	Plain	8.4	7.5	6.24	6.01
	Waxed paper	...	7.4	.....	6.74
	Foil	...	7.4	.....	6.60
Grained caramel	Plain	8.1	6.9	8.08	11.12
	Waxed paper	...	7.2	.....	9.70
	Foil	...	6.9	.....	9.38
Chocolate-coated peanut roll bars	Plain	8.7	5.6	8.40	5.51
	Waxed paper	...	5.9	.....	5.35
	Foil	...	6.3	.....	5.57
Chocolate-coated coconut cream bars	Plain	7.6	3.5	9.54	9.83
	Waxed paper	...	5.9	.....	10.43
	Foil	...	5.7	.....	10.01
Caramel-nougat bars	Plain	7.6	6.2	9.91	8.62
	Waxed paper	...	7.5	.....	6.64
	Foil	...	7.1	.....	7.65
Coconut drops	Plain	8.4	6.7	10.46	13.34
	Waxed paper	...	6.8	.....	13.52
	Foil	...	6.8	.....	13.32
Chewy caramel	Plain	8.0	6.7	10.55	8.20
	Waxed paper	...	6.8	.....	7.73
	Foil	...	6.8	.....	7.49
Chocolate-coated fudge bars	Plain	8.4	6.0	12.14	12.54
	Waxed paper	...	7.2	.....	10.16
	Foil	...	7.4	.....	15.23
Plain starch-jelly bars	Plain	8.6	7.2	13.24	10.41
	Waxed paper	...	7.6	.....	7.07
	Foil	...	7.4	.....	11.16
Gum drops	Plain	7.1	7.0	15.11	13.14
	Waxed paper	...	7.1	.....	14.74
	Foil	...	7.4	.....	13.74
Caramel-nougat disks	Plain	7.5	5.8	15.82	12.40
	Waxed paper	...	5.3	.....	7.97
	Foil	...	4.6	.....	8.71
Starch-jelly (with fruit) disks	Plain	7.8	6.6	15.98	14.65
	Waxed paper	...	7.2	.....	14.20
	Foil	...	7.0	.....	14.53
Starch-jelly (with fruit) bars	Plain	8.1	7.1	17.73	13.74
	Waxed paper	...	7.5	.....	13.27
	Foil	...	7.1	.....	11.95

* 9.0 represents perfect; 4.5, or lower, is unacceptable.

** Samples stored six months at 70 deg. F.

TABLE II—STORAGE Temperatures Affect Shelf-Life of Candies.

Type	Storage Temperature (Deg. F.)	Organoleptic Score* Initial	Organoleptic Score* After Storage**	Moisture Content (Percent) Initial	Moisture Content (Percent) After Storage**
Peanut block	32	7.4	6.6	3.00	2.72
	70	...	5.9	.....	3.57
	70–100	...	5.9	.....	3.64
Spun-peanut butter bars	32	8.0	6.9	3.55	3.41
	70	...	6.9	.....	3.93
	70–100	...	6.8	.....	3.84
Pan-coated peanuts	32	8.6	7.3	4.32	2.55
	70	...	6.8	.....	2.92
	70–100	...	7.1	.....	2.95
Candy corn	32	8.4	7.8	6.24	6.28
	70	...	7.5	.....	7.27
	70–100	...	7.4	.....	6.22
Grained caramels	32	8.1	6.9	8.08	8.56
	70	...	7.2	.....	9.19
	70–100	...	6.9	.....	10.05
Chocolate-coated peanut roll bars	32	8.7	6.4	8.40	5.31
	70	...	5.9	.....	5.35
	70–100	...	5.6	.....	5.20
Caramel-nougat bars	32	7.6	6.7	9.51	7.70
	70	...	7.5	.....	6.64
	70–100	...	7.5	.....	7.30
Chocolate-coated coconut cream bars	32	7.6	6.8	9.54	8.77
	70	...	5.9	.....	10.46
	70–100	...	5.8	.....	9.99
Coconut drops	32	8.4	7.3	10.46	13.54
	70	...	6.8	.....	13.52
	70–100	...	6.5	.....	13.76
Chewy caramel	32	8.0	6.2	10.55	8.82
	70	...	6.8	.....	7.73
	70–100	...	6.9	.....	7.75
Chocolate-coated fudge bars	32	8.4	7.0	12.14	15.59
	70	...	7.2	.....	10.16
	70–100	...	7.1	.....	12.84
Plain starch-jelly bars	32	8.6	7.3	13.24	11.56
	70	...	7.6	.....	7.07
	70–100	...	7.4	.....	11.91
Gum drops	32	7.1	6.6	15.11	14.51
	70	...	7.1	.....	14.74
	70–100	...	6.6	.....	14.47
Caramel-nougat disks	32	7.5	6.8	15.82	8.15
	70	...	5.3	.....	7.97
	70–100	...	6.0	.....	8.12
Starch-jelly (with fruit) disks	32	7.8	7.5	15.98	15.43
	70	...	7.2	.....	15.20
	70–100	...	7.3	.....	14.18
Starch-jelly (with fruit) bars	32	8.1	7.1	17.73	12.81
	70	...	7.5	.....	13.27
	70–100	...	7.3	.....	13.20

* 9.0 represents perfect; 4.5, or lower, is unacceptable.

** Samples stored six months at 32, 70, and 70–100 deg. F. in wax-paper wrapped cartons.

Of the 42 candies, 31 contained 3 to 13 percent sorbitol (dry basis) as an humectant. Sorbitol in 70 percent solution was substituted for part of the invert syrup. Four of the candies —two caramel-nougat bars and two caramel-nougat disks—contained different vegetable fats. And candy corn had different amounts of fats.

Organoleptic and chemical examinations are currently being made at 3-month intervals. This report includes data on the 3- and 6-month examinations.

Storage methods have been described in previous reports.[1,2] In general, examinations were similar to those followed by the Quartermaster Food & Container Institute of Chicago.

Possibly no food item is packaged in as wide a variety of material as candy. Packages comprise many kinds of bags, boxes, jars, and cans. Some are individually wrapped. Others are double- or, triple-packaged. And still others are unpackaged.

Widely different packaging practices arose from varying protective needs—moisture, oxidation, color, and flavor changes. Some candies are glazed or specially coated as a partial substitute for expensive containers. Others are exposed and need hermetically sealed containers.

Data on the storage of 16 varieties of candy packed in 1¼-lb. cartons—which were unwrapped, overwrapped with waxed paper, and wrapped with aluminum foil—indicated that proper packaging was the most practical way to nullify the ill-effects of a too-high or too-low relative humidity. And if the packages were moistureproof, there was little or no change in the moisture content of the candies, irrespective of the humidity. When candies of widely different moisture content were stored in the same room, moisture was transferred from one variety to another.

Table I shows the organoleptic scores and moisture content of 16 candies, initially and after 6 months' storage at 70 deg. F. in the different type packages.

All candies (except gum drops) which were overwrapped in waxed paper and aluminum foil showed less changes in moisture and quality than

Antioxidants Curbed Rancidity

TABLE III—EFFECTIVENESS of Antioxidant, Tenox II, Influenced by Variety of Candy.

Type	Storage Temp. (Deg. F.)	Antioxidant, Tenox II (Percent)	Organoleptic Score* Initial	Organoleptic Score* After Storage**	Free Fatty Acids (Percent) Initial	Free Fatty Acids (Percent) After Storage**	Peroxide No. (Percent) Initial	Peroxide No. (Percent) After Storage**
Coconut drops	32	0.00	8.4	7.3	1.5	<0.3	9.9	< 1.0
		0.01	8.3	7.6	1.6	1.5	12.3	< 2.3
	70	0.00	8.4	6.8	1.5	2.1	9.9	27.9
		0.01	8.3	6.7	1.6	1.8	12.3	< 1.4
	70–100	0.00	8.4	6.5	1.5	1.8	9.9	< 0.7
		0.01	8.3	5.9	1.6	3.5	12.3	< 1.8
Pan coated peanuts	32	0.00	8.6	7.3	0.7	1.2	15.8	26.9
		0.01	8.2	7.1	0.7	0.8	20.9	19.3
	70	0.00	8.6	6.8	0.7	1.0	15.8	23.3
		0.01	8.2	7.2	0.7	0.8	20.9	43.2
	70–100	0.00	8.6	7.1	0.7	0.7	15.8	23.3
		0.01	8.2	7.1	0.7	0.9	20.9	19.0
Peanut blocks	32	0.00	7.4	6.9	0.9	0.9	5.6	4.6
		0.01	7.7	6.9	1.0	0.5	4.5	3.1
	70	0.00	7.4	5.9	0.9	0.9	5.6	4.8
		0.01	7.7	5.2	1.0	0.7	4.5	9.4
	70–100	0.00	7.4	5.9	0.9	0.7	5.6	4.9
		0.01	7.7	6.0	1.0	0.5	4.5	8.5
Peanut-roll bars	32	0.00	8.7	6.4	0.9	1.9	15.0	27.8
		0.01	8.6	6.6	0.5	0.7	6.0	14.1
	70	0.00	8.7	5.9	0.9	1.0	15.0	9.5
		0.01	8.6	7.1	0.5	0.9	6.0	10.1
	70–100	0.00	8.7	5.6	0.9	1.3	15.0	12.4
		0.01	8.6	6.9	0.5	1.4	6.0	9.4
Spun peanut butter bars	32	0.00	8.0	6.9	1.0	1.8	9.0	18.6
		0.013	7.8	5.9	1.4	1.2	6.8	12.5
	70	0.00	8.0	6.9	1.0	2.2	9.0	25.0
		0.013	7.8	6.9	1.4	1.9	6.8	23.1
	70–100	0.00	8.0	...	1.0	...	9.0	...
		0.013	7.8	...	1.4	...	6.8	...

* 9.0 represents perfect; 4.5, or lower, is unacceptable.
** Samples stored six months.

those in plain cartons. The overwraps retarded graying of the finish of the chocolate-coated candies and sweating of gum drops. They also retained the fresh flavor of the confections.

Chocolate-fudge bars, peanut-roll bars, chocolate-coated spun peanut butter bars, and pan-coated peanuts were less stale or rancid. These overwraps also minimized molding chocolate-coated coconut and chocolate-coated spun peanut butter bars, and reduced crystallizing or sweating of sanded starch jellies.

Regardless of storage temperatures, overwraps had a beneficial effect on candies. There was a greater difference between overwrap and no overwrap than between waxed paper and foil.

Protection Varies

The foil overwrap reacted differently at varying temperatures. However, there was little difference in the effect of the waxed-paper overwrap at different temperatures. At 32 deg. F., moisture contents of all candies in foil-wrapped cartons was nearer to original values than those packed in unwrapped and waxed-paper wrapped cartons.

In relation to moisture changes during storage, the twelve varieties can be grouped into those that: (1) Gained (coconut cream, peanut bars, pan-coated peanuts, peanut-roll bars, grained caramel, and caramel nougat); (2) remained unchanged (gum drops, spun-peanut butter bars, and chewy caramels); and (3) lost (coconut drops, chocolate fudge, and starch jellies).

Moisture changes were slightly less in foil than in waxed-paper wrapped cartons. However, these changes were considerably greater in plain cartons than in those that were foil or waxed-paper wrapped.

The data indicate that different candies require different humidities during storage. And when stored together in the same room, some lost moisture while others gained.

After six months, peanut planks, chocolate-coated peanut-roll bars, fudge bars, spun-peanut butter bars, and coconut bars were better when stored in foil-wrapped than in waxed-paper wrapped cartons. Waxed-paper overwrapped cartons were equally as good as foil for caramel-nougat and starch-jelly bars. Plain cartons were as good as foil- or waxed-paper overwrapped boxes for candy corn, pan-coated peanuts, cellophane-wrapped chewy caramels, and grained caramels.

The gum drops were highly flavored. When stored in plain cartons, some of the flavor was lost, thus actually improving the taste of these gum drops.

From these results, it appears that the type of candy and coating, and also relative humidity, determine the need for overwrapping. For example, candy with exposed nuts (peanut planks) or those without a coating responded most favorably to a foil overwrap. Candies protected with a glaze coating (candy corn or pan-coated peanuts) or those individually wrapped in cellophane or foil kept as well in plain as in foil-overwrapped cartons.

Thus, it seems that candy centers with a high fat content—such as nuts and caramels—or those sensitive to moisture fluctuations—such as soft creams, marshmallows, and fudge—must be protected by a good coating, by wrapping individual pieces, or by overwrapping the packages.

Storage Temperatures

As shown in recent experiments, storage temperature was more important in retention of candy quality than an humectant or antioxidant, and it was equally as important as the type of package.[1,5,8]

A summary of organoleptic scores and moisture content of 16 candies, initially and after 6 months' storage at 32, 70, and 70 deg. F. (three weeks) alternating with 100 deg. F. (one week), in waxed-paper overwrapped cartons, is shown in Table II.

After six months at 32 deg. F., there were practically no changes in eating quality or moisture content of any of the candies. There was slight cracking of coatings on the chocolate-fudge bars (probably due to low storage-room humidity), dulling of the finish of caramel-nougat bars and disks, and slight sweating of gum drops (due in part to formulation of the candy).

At this temperature, there was less moisture change in candies packed in cartons with foil- and waxed-paper overwraps and plain cartons, respectively. Gum drops, starch jelly, chocolate-coated fudge bars, peanut-roll bars, and caramel-nougat bars had a higher moisture content than at other temperatures.

At 70 deg. F., seven candies were scored as high or higher than the same confections held at 32 deg. F. The remaining nine were rated higher when stored at the lower temperature. When held at 70 deg. F. for six months, pan-coated peanuts, candy corn, starch jelly, chewy and grained caramels, coconut drops, and chocolate-coated fudge bars were in good condition. The chocolate-coated spun peanut bars, coconut bars, and disks packed in plain cartons were poor in quality. Gum drops and caramel-

nougat bars did not change appreciably. It should be remembered that practically all of these candies were summer coated according to Quartermaster specifications.

A progressive decrease took place in the moisture content of candies stored in plain, foil-wrapped, and waxed-paper wrapped cartons, respectively. Peanut planks, coconut drops, and candy corn kept at 70 deg. F. had higher moisture content than when stored at 32 deg. F. or at 70 deg. F. and alternating at 100 deg. F.

At 70 deg. F. (three weeks), and alternating at 100 deg. F. (one week), all candies were adversely affected in appearance, except candy corn and starch jelly. Peanut candies were stale. Those with coconut centers turned yellow. Fudge, caramel, and gum drops became sticky. And many of the chocolate coatings showed fat bloom.

At these alternate temperatures, candies held in plain, foil-wrapped, and waxed-paper wrapped cartons showed less change in moisture content than when stored at lower temperatures. Coconut bars and disks, pan-coated peanuts, and grained and chewy caramels had a higher moisture content than at the other temperatures.

Candies with exposed nuts, high fat content, or little or no coating tended to break down at the higher temperatures. On the other hand, those without peanuts, coconut, or other fats and those with an excellent coating, held up well under refrigeration and fairly well at elevated temperatures.

Addition of Antioxidants

Candies contain fats in the form of added butter, hydrogenated oil, nuts, coconut, and chocolate. The stability of these ingredients is extremely important to the shelf-life of the candy.

Several factors determine the stability of these fats. Among them are treatment prior to use in candies, amount of exposure to air, storage temperature, and presence of a natural or an added antioxidant.

According to Becker,[4] fats are added to lubricate and improve the flavor of candies. However, they create a rancidity problem. An antioxidant was of some value, but it did not work equally well with all fats.

Reported in order of their stability to rancidity were cocoa butter, hydrogenated coconut oil, 76-deg. F. coconut oil, hydrogenated peanut oil, hydrogenated cottonseed oil, other domestic plant oils, butterfat, and other animal fats.

The fat content of cocoa should not exceed 10 percent or the finish will bloom or lose its gloss. Cocoa butter and hard coconut-type fats were not compatible.

Farrell and Alikonis[5] reported the development of a new cocoa-type coating for confectionery rations that withstands temperatures up to 120 deg. F. Its taste could not be differentiated from the regular type of fine chocolate coatings.

Robinson[6] found that oxidation of unsaturated fats, formation of free fatty acids, and "reversion" may produce undesirable flavors and odors in candy. Fatty acids in butter may hydrolyze and produce an unpleasant

(Turn to page 153)

Sorbitol Retained Moisture in Confections

TABLE IV—BENEFITS From Use of Humectant, Sorbitol, Varies With Type of Candy

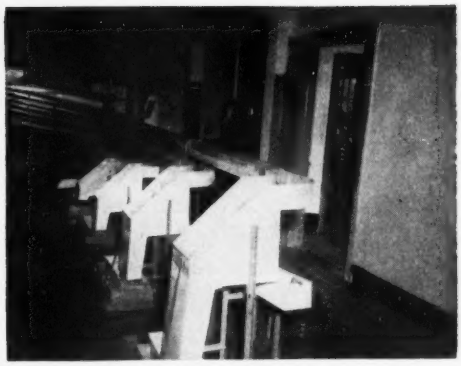
Type*	Storage Temp. (Deg. F.)	Sorbitol** (Percent)	Organoleptic Score*** Initial	Organoleptic Score*** After Storage	Moisture Content (Percent) Initial	Moisture Content (Percent) After Storage
Candy corn	32	0	8.2	7.0	5.58	5.86
	70			7.4		6.37
	70-100			7.4		6.18
	32	5	8.3	7.6	5.92	6.28
	70			7.4		7.27
	70-100			7.5		6.22
Grained-caramel bars	32	5	8.1	6.9	8.08	9.96
	70			7.2		9.70
	70-100			6.9		10.97
	32	8	8.1	7.0	10.29	8.58
	70			6.9		9.19
	70-100			7.1		10.05
Peanut-roll bars	32	5	8.7	6.4	8.40	5.30
	70			5.9		5.35
	70-100			5.6		5.20
	32	8	8.6	6.6	8.55	5.99
	70			7.1		5.74
	70-100			6.9		5.56
Caramel-nougat bars	32	5	7.6	6.7	9.91	7.70
	70			7.5		6.64
	70-100			7.5		7.30
	32	8	7.6	6.2	13.83	8.58
	70			7.0		8.56
	70-100			6.2		9.36
Chocolate-coated coconut bars	32	0	8.4	7.3	10.46	13.54
	70			6.8		13.52
	70-100			6.5		13.76
	32	9	8.3	7.6	10.98	13.50
	70			6.7		13.68
	70-100			5.9		13.49
Chewy caramel bars	32	5	8.0	6.2	10.55	8.82
	70			6.8		7.73
	70-100			6.9		7.75
	32	8	7.7	7.2	8.48	8.74
	70			7.0		7.17
	70-100			7.0		7.57
Chocolate-coated fudge bars	32	9	8.4	7.0	12.14	15.59
	70			7.2		10.16
	70-100			7.1		12.84
	32	13	7.8	7.2	10.10	14.51
	70			7.3		12.87
	70-100			7.5		13.38
Plain starch-jelly bars	32	5	8.6	7.3	13.24	11.56
	70			7.6		13.17
	70-100			7.4		11.91
	32	8	8.4	7.3	12.70	12.14
	70			7.5		10.50
	70-100			7.3		11.01
Gum drops	32	0	7.1	6.6	15.11	14.51
	70			7.1		14.74
	70-100			6.6		14.47
	32	10	7.4	6.9	15.77	13.79
	70			7.0		14.17
	70-100			6.9		14.71
Caramel-nougat disks	32	5	7.5	6.8	15.82	8.15
	70			5.3		7.97
	70-100			6.0		8.12
	32	8	7.0	6.3	12.30	9.31
	70			5.9		9.23
	70-100			5.3		10.09
Starch-jelly (with fruit) disks	32	5	7.8	8.5	15.98	15.43
	70			7.2		14.20
	70-100					
	32	8	7.7	7.5	15.00	13.26
	70			6.4		14.76
	70-100					
Starch-jelly (with fruit) bars	32	5	8.1	7.1	17.73	12.81
	70			7.4		13.27
	70-100			7.5		13.20
	32	8	7.9	6.9	14.43	12.47
	70			7.1		12.92
	70-100			7.3		12.79

* Samples in wax-paper wrapped cartons.

** On a dry basis.

*** 9.0 represents perfect; 4.5, or lower, is unacceptable.

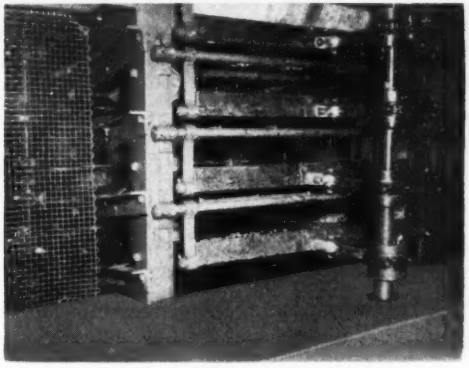
PEAS FEED from spout (arrow) to hopper supplying top inclined shaking screen. Smaller sizes drop through directly undamaged. Note cleaning devices under screens.



FOUR GRADES of peas are spouted down to filling operations carried out on the floor below. Extra grades can be added by simple addition of screens to unit.

SHAKER IMPROVES SIZE GRADING

Wisconsin canner advances pea processing by designing novel vibrating sieve . . . Space and cleanup time are saved; grader "cripples" eliminated . . . Adaptability to other products seen



AUTO CONNECTING RODS operate off eccentric cams on driveshaft (right) to move grading screens in vibratory fashion. Note double bearings suspending screens. At left is transmission that moves cleaning devices.

W. G. GLASCOFF

President, Canned Foods, Inc., Waupun, Wis.

Despite many recent improvements in cylindrical type pea graders, this important unit operation continues to be a potential trouble spot in an otherwise well mechanized canning process.

It is necessary to control carefully the feed to such a unit. Surge overloading is a common trouble and results in costly product breakage and also loss of small peas carried over into larger sizes. The very nature of ordinary cylindrical sizing concentrates a crushing mass of product in the small lower arc of the machine, resulting in an excessive quantity of broken peas. Bulky rotary graders occupy too much floor space and require tedious, constant cleaning.

Since no suitable method was available, our company, Canned Foods, Inc., of Waupun, Wis., called upon the talents of its skilled plant mechanic and worked out the idea and built a grader which would operate on the flat screen shaking principle.

Perfected over the past two years and used commercially throughout the '52 pack, this unit has been found to offer these six marked advantages over the method it supersedes:

- **Increases capacity**
- **Requires less than ⅓th the floor area**
- **Virtually eliminates crushing and mechanical damage to product**
- **Saves in cleaning time, requiring only 10 min., against former 2 hr.**
- **Easily adapts to any number of screen sizes.**
- **Is simply installed due to compactness, portability, in fact it's entirely self contained.**

One problem prompting development of the new unit was the unavoidable fact that in rotary screening small sizes must pass through the screens first. As a result, the heavy mass of the large product traverses the entire length of the grader. And the weight of the large sizes on the smaller sizes accounts for the damage by crushing.

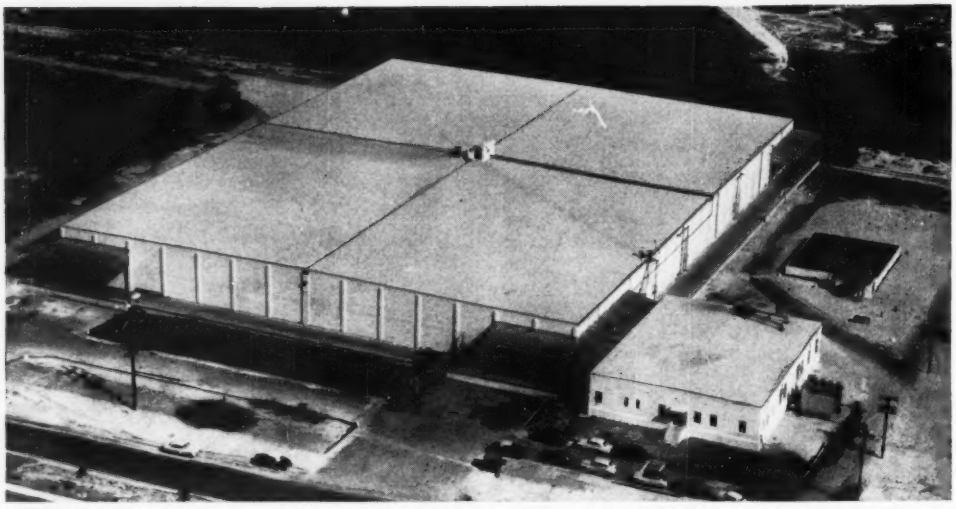
But by employing a series of flat vibrating screens, one above the other, the largest screen size is used at the top of the unit, hence smaller sizes immediately drop through undamaged to lower vibrating screens.

Sheet-Type Movement

Also, the large, fully used, flat area of the vibrating screens permits a sheet-type movement of peas, rather than a mass, rolling through-type movement, and thus mass crushing is eliminated.

In working out the ideas, a rugged, welded-steel frame was constructed from which was suspended a series

(*Turn to page 149*)



DIVIDED into 4 rooms, warehouse holds over 2½ million cases of frozen concentrate. Note roof entrance to coil room.

Construction Innovations Provide

Zero-Storage Economies

Low costs and high operating volumes feature new warehouse. It has a sand-fill floor insulation, blown glass-fiber ceiling, and central coil room

FRANK E. PENN
Assistant to the President, Minute Maid Corp., New York

One of the South's newest and largest refrigerated warehouses has been designed with a number of unique features.

Located at Plymouth, Fla., Central Florida Refrigerated Warehouse Corp.'s million dollar, 2½-million-cu. ft., sub-zero storage building saved construction dollars with these erection-economizers:

1. No insulation has been provided beneath the floor. Instead, the insulating effect is derived from a dry porous sand foundation which exceeds 15 ft. in depth.

2. The ceiling insulation consists of a blown glass fiber fill. This material is approximately 20 in. thick and is supported by a thin glass-fiber mat resting on ordinary chicken wire screen.

3. The refrigerated coils and fans are located around a small 14 ft. sq., insulated room in the center of the warehouse. This room contains all the refrigeration, electrical equipment, and controls for operating the fans and coils. It is open to the outside and is accessible from the building's roof.

Overall dimensions of the cold storage section proper are 371 by 282 ft. —room for over 2½ million cases of citrus concentrate. This space is divided into four almost equal-volume rooms, each capable of being operated independently of the others. There are no connecting doorways between rooms, the only access (except the escape hatches in the central room) being from the outside loading platform.

Product movement to and from the four rooms is through corner vestibules, which act as cold-air locks and allow for streamlined materials handling. A 16-ft. wide platform girds the entire building to expedite truck loading and unloading on three sides and rail shipments on the fourth.

Warehouse refrigerant load was designed for 160 tons—21.4 tons from

Cold Facts On Operation

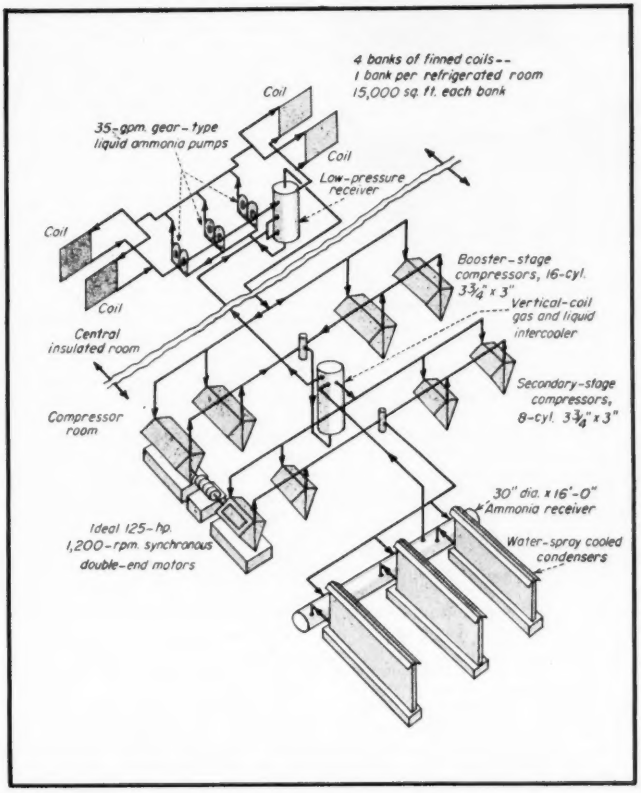
The new Central Florida Refrigerated Warehouse Corp.'s building is located adjacent to the main plant of Minute Maid Corp. at Plymouth, Fla.

Although owned by Central Florida, the warehouse is being operated by the frozen citrus juice concentrator under a ten-year lease. The building was erected to provide large-volume, zero-degree storage convenient to the manufacturing facilities of Florida's frozen concentrators.

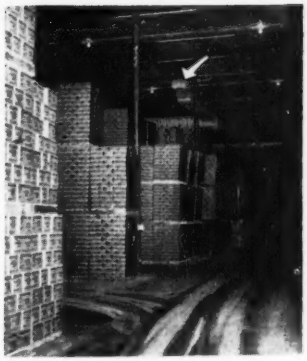
Shipments are received from all parts of the state—practically 100 percent by refrigerated or insulated tractor trailers—for intermediate storage prior to shipment to terminal warehouses.

This permits controlled deliveries from the manufacturing area to the markets in accordance with consumer demand. And the need for this type of distribution is becoming increasingly important because of the shortage of satisfactory sub-zero space throughout the country.

Advanced Refrigeration and Power Facilities

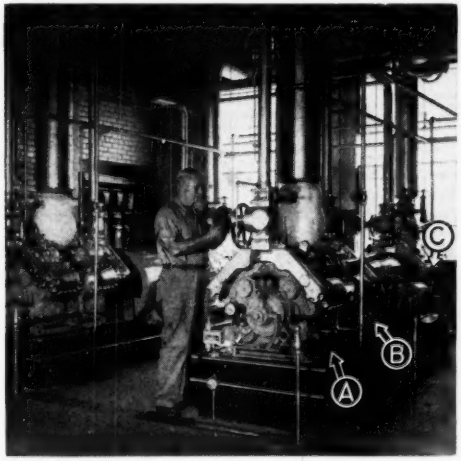


ESSENTIALS of refrigeration system are presented in this isometric flowsheet. Pumps and coils are either in or around central insulated room.

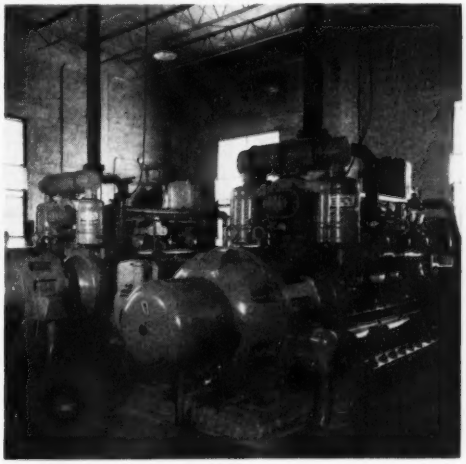


INSIDE VIEW of cold-storage area. Arrow shows chilled-air outlet.

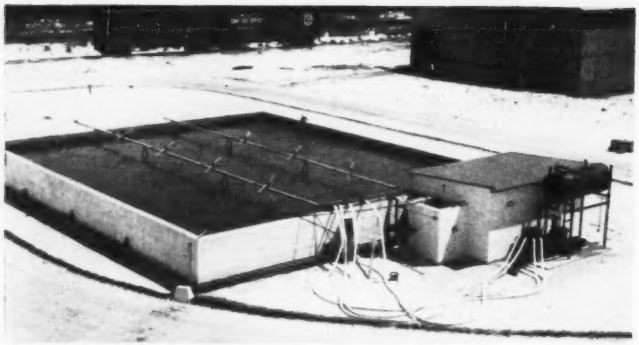
LOOKING into vestibule from outside. Air-lock arrangement can be seen.



REFRIGERATION is supplied by these V-type ammonia compressors. Booster (A) is driven by double-shafted motor (B), as is high-stage unit at far end (C).



EMERGENCY power is immediately available from diesel-driven generators. The diesels (background) are started with the help of a gasoline engine.



CONCRETE SUMP provides water for fire sprinkler system and for cooling standby diesels.

the fan motors, 34 tons for loading and unloading product, and the bulk of the remainder from heat leakage in the building itself. Four 125-hp. duplex, high-speed (1,200-rpm.). V-type compressors, operating in a conventional two-stage arrangement, serve the ammonia system.

These machines are located in a small combination office-compressor building immediately adjacent to the storage area. They supply refrigeration to the low-temperature coil evaporators located at the central insulated room. York Corp. furnished the entire cooling system.

In the system each motor drives both a booster and high-stage compressor through a double drive shaft. The multiplicity of small compressor cylinders (3¾ in. dia by 3 in. height, with 16 per booster and 8 per secondary unit) allows for high speed, economical operation with considerable space savings.

The smaller units require only a fraction of the concrete used in foundations for compressors of the more conventional type, thus effecting economies in the original installation.

The compressed ammonia gas is liquified in three surface condensers, cooled by water sprays, and then piped to a low-pressure receiver in the central room of the warehouse. Three 35-gpm. gear pumps then circulate liquid ammonia from the bottom of the receiver through the finned coils in each of the four sub-zero storerooms. (There is about 15,000 sq. ft. of surface in each bank.) Four 25-hp. axial fans move 40,000 cfm. of air through each coil, lowering the temperature to −17 deg. F.

Return refrigerant is flashed into the vapor space of the receiver and returned to the suction side of the compressor system via an 8-in. vapor line.

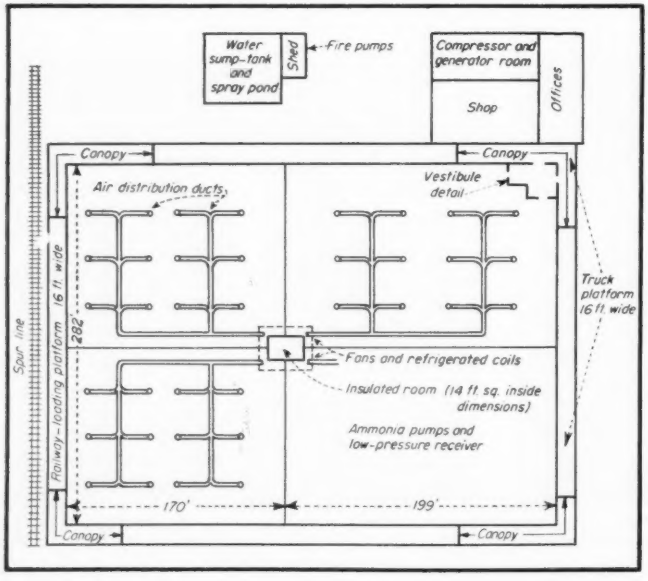
Sandy Soil Helps

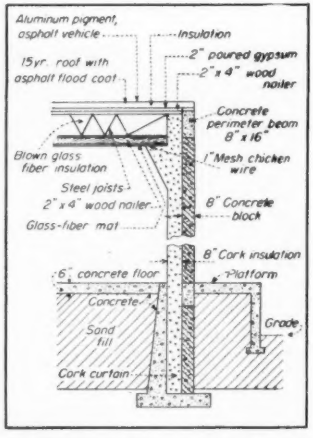
Calculations showed that if the sand below the storage area remained dry, a 5-ft. depth of soil would be the equivalent to 8 in. of cork. Since the sub-surface water level is 17 ft. below grade, Central Florida designed the building with no floor insulation. Heat leakage around the outside walls below floor level is prevented by an 8-in. cork curtain wall which is a continuation of the main insulating wall.

This design saved on cork, the concrete and steel for a sub-floor, and eliminated the need for a ventilation system below the floor.

The unusual ceiling construction is topped with a 15-yr. bonded roof made from slag and gravel over Alfol —a vapor sealing material of felt bonded to aluminum, felt side down. This seal is placed directly over a 2-in. poured-gypsum deck reinforced with wire mesh. The entire roof is sup-

Novel Layout and Design Details





↑ **HOW** floor and roof are built.

←**GENERAL** arrangement of warehouse elements can be spotted with this plan view.

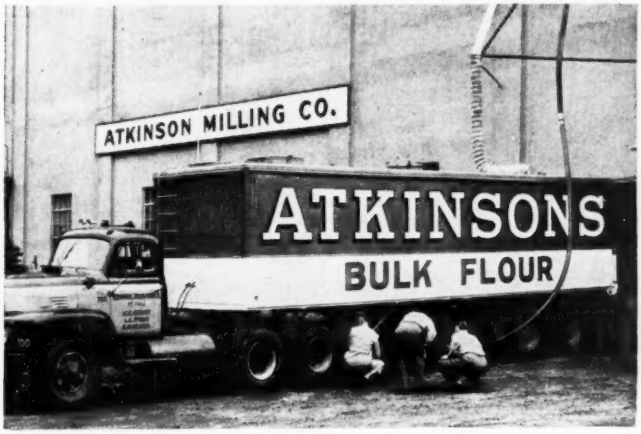
ported by bar joists resting on girders. Wooden nailer strips are fastened at right angles to the bottom of the joists and ordinary chicken wire tacked to the nailers.

A 1/32-in. thick glass-fibre mat rests on this wire, and the space between mat and gypsum filled with blown glass fiber. Therefore the supporting steel frame is embedded in the insulation and is expected to stay at an average of around 60 deg. F., unlike many cold rooms where all roof steel is exposed to freezing temperatures.

Placement of the unique insulated room in the center of the warehouse for the ammonia pumps and coil controls paid off in reduced initial cost and is now paying off in reduced maintenance. This centralized construction saved considerable investment in multiple air coolers, their attendant refrigerant water piping, and electrical service.

Additional protection for the warehouse has been provided in the form

(*Turn to page 180*)



LABOR-SAVING new bulk-flour truck is demonstrated at mill. Flour is chuted into tralier's five compartments, then 40,000-lb. load is discharged through hose to 50-ft. height in 1 hr.

New Bulk Flour Truck Aids Miller, Baker

Saves bagging and handling costs. Has air-activator to "fluidize" product for easy movement. Flow rate calculated to eliminate dust problem

FE STAFF

Handling dry ingredients in bulk has set new standards in economy and sanitation for many food plants. But use of this fast developing technique has been largely restricted to locations served by railsidings.

Most bakeries have been denied the advantages of bulk dry handling. So Atkinson Milling Co., Minneapolis, worked out a system for truck bulk distribution. And in June of this year, the first carrier of this type was placed into operation.

Atkinson's new development removes sack handling, storage, and dumping operations in the bakery. And its full use will benefit the miller as well. Eventually it should eliminate filling, sewing, and bagged-flour storage, plus the tedious chore of building truck loads.

To receive bulk flour in trucks, the baker has only to install a bin and a screw, gravity, or pneumatic conveyor to transfer the flour to processing operations.

Has 5 Compartments

The bulk truck carrier utilizes a semi-trailer divided into five stainless-steel, hatch-topped compartments, which can carry 40,000 lb. of flour. A self-contained air-activator — powered from the tractor, loads and unloads the flour by blowing or sucking it through a portable hose.

In a working demonstration, a flexible tube running from one of the mill's huge storage bins was shifted from hatch to hatch to fill all five compartments of the carrier. Then, the same flour was discharged through a 75-ft. rubber hose into a standard delivery bin. Flour also was lifted 50 ft. to the fourth floor.

How Unloader Works

Developing a light, compact flour-pumping device presented a major problem. And in addition to compactness, the ideal pump would have to move the product at about 1,000 lb. per minute, rather than at blasting speed. Higher flow rates present expensive and difficult dust-control problems.

The answer here was found in "fluidizing" the flour—introducing a controlled quantity of air so that product would flow through the hose with very little pressure behind it.

Motor-driven pumps mounted on the trailer supply air which is mixed in predetermined proportion with flour in a pressurized actuating unit. Actual pumping pressure is only 5 to 10 psi., yet this moves the product more than 100 ft. horizontally or 50 ft. vertically.

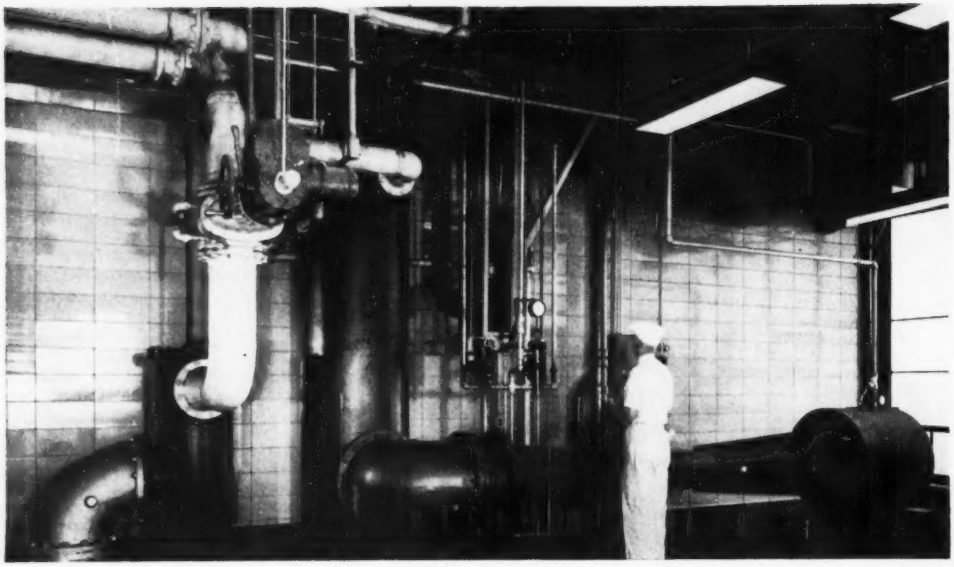
Viewed at the discharge end, the rate of flow appears deceptively slow due to its fluidity. Actually, a full 40,000-lb. load is moved into the bakery in less than an hour. And because of the fluid state of the flour, dust collectors or elaborate fillers on the receiving end are superfluous.

Another problem—that of weight control—soon will be solved by installation of a 50-ft. truck scale which will punch tickets and provide accurate net weights under state inspection.

Company Plans

Although Atkinson expects to have more of these units as time goes on, its plans do not include manufacture of either the bulk carrier or its special actuating unit. Rather, it intends to have the actuators manufactured under a licensing agreement and then sold freely to makers of truck, trailer, and railroad-car equipment.

With vacuum cooler and . . .



STEAM-JET REFRIGERATOR at H. J. Heinz Co. speeds vinegar-mash cooling. At left is seen barometric condenser used for first stage cooling. And at right is steam-jet booster that lowers vacuum in final stage to 29.6 in. Hg.

VACUUM COOLING
Saves Costly Process Time

In a wide variety of food processing operations, efficient "vac-evap" is not only (1) speeding output but is also (2) cutting down labor needs, while (3) avoiding spoilage losses—all at generally lowered expense

IVAN C. MILLER
Assistant Editor, "Food Engineering"

Cooling by vacuum evaporation is currently finding profitable application in a wide range of food plants—solving a variety of tough processing problems.

Notable for supplying refrigeration at low cost, this technique does more than merely accelerate cooling operations, as demonstrated by its efficiency in the following broad categories:

A—Mash cooling. Removes the heat from vinegar mash, for example (with a drop of 250-270 deg. F.) to accurately controlled, varying end-temperatures.

B—Products of large mass. Here, heat is rapidly removed from center of each piece, as well as from surface.

C—Leafy vegetables. Here, bruising is avoided, spoilage retarded, and shipping costs reduced.

D—Hard-to-cool viscous liquids. Job is done in limited space and with minimum power requirements.

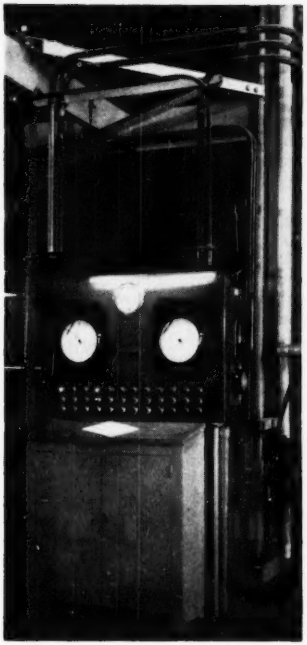
E—Well-water compensation. Supplies at least one answer to problem of diminishing deep-well water.

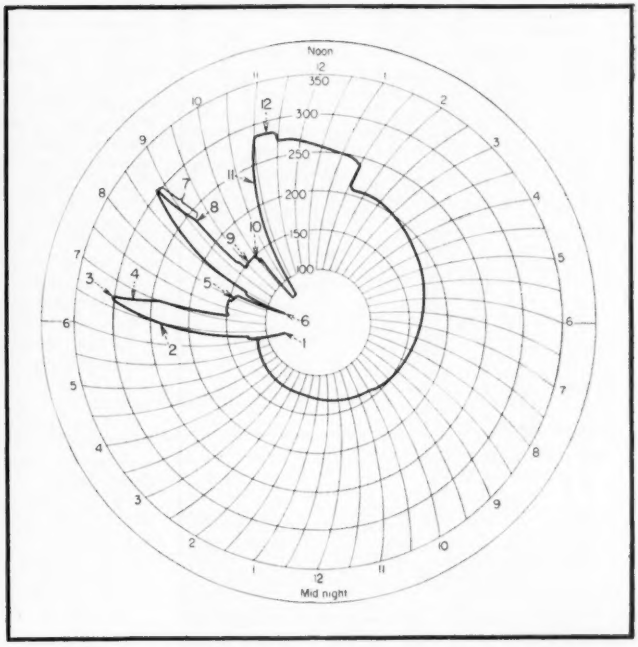
Each of these spheres of operation will be detailed later in this report, with specific installations illustrated.

In addition, it is to be noted that several breweries and distilleries now use steam-jet cooling. The method has also been successfully applied in the making of starch and sugar. And still other uses are being projected.

Within the range of its effectiveness—end-points above freezing—vacuum evaporation cooling is now employed to lower the temperatures of raw materials, products during

controls . . . **. . . it's shorter time, higher accuracy**





PUSHBUTTONS (photo above) control pumps and motor-operated water-and-steam valves. Chart (right) is record of these cycle operations: (1) Mash to cooler, (2) heating cycle, (3) steam off, (4) first stage cooling, (5) mash to drop-tank, (6) tank unloaded, (7) bleed through bypass, (8) main valve opened, (9) slurry added, (10) transfer air admitted, (11) wash water heated, and (12) wash water cooled. (Ed Walsh photos)

processing, finished products, and water for recycling. The technique, of course, is limited to applications where a weight loss due to evaporation is permissible. Such loss may range to 10 percent.

Two methods are employed to maintain the vacuum required for rapid cooling. One is mechanical, the other uses steam jets for evacuation. Both depend on condensers for collecting and removing the large volume of moisture, vaporization of which takes heat from the product cooled.

Rotary Vacuum Pump Method

When mechanically driven pumps are used to pull the vacuum, the oil-sealed rotary-type is preferred. As high vacuums are reached, efficiency falls more sharply with reciprocating pumps than with rotary units.

Some rotaries will draw a vacuum of 29.6 in. of mercury with better than 70 percent efficiency, while the efficiency of conventional reciprocating pumps is often less than 30 percent at the same pressure level. Maintaining a vacuum between 29.6 and 29.8 in.–a pressure zone often employed for vacuum cooling–is beyond the efficiency range of reciprocating compressors.

When using an oil sealed rotary pump, provisions must be made for condensing the evaporated moisture before it reaches the pump. Any trace which escapes the condensers is trapped with oil seal lubricant in the exhaust stream from the pump. Lubricant is returned to pump, water discharged to the sewer.

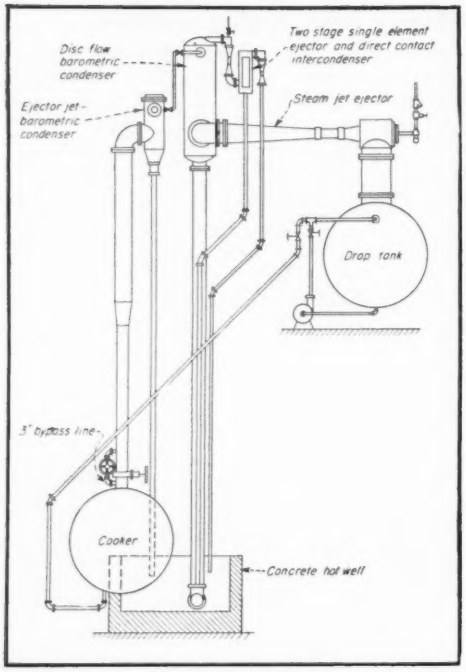
In plants where steam is not available, the rotary pump is usually chosen to maintain the high vacuum required for evaporative cooling. But in plants having steam–even at pressures as low as 2 psi.–steam-jet refrigeration, has proved to be efficient and dependable in operation, and it can be installed at low initial cost.

This is how the latter system functions: Steam operated ejectors draw the air from the enclosure in which cooling takes place. The vacuum thus created lowers the boiling point of the liquid in the confined space, until its temperature and its boiling point are the same. Then the rapid evaporation which follows cools the remaining liquid.

The amount of vacuum required for a desired end-point temperature is readily obtained from this table:

Pressure (In. Hg)	Pressure (In. Hg Ab.)	End-Point Temperature (Deg. F.)
29.80	0.20	34.6
29.75	0.25	40.2
29.70	0.30	45.0
29.65	0.35	49.1
29.60	0.40	52.6
29.55	0.45	55.9
29.50	0.50	58.8
29.45	0.55	61.5
29.40	0.60	63.9
29.35	0.65	66.3
29.30	0.70	68.4
29.25	0.75	70.4
29.20	0.80	72.3
29.15	0.85	74.1
29.10	0.90	75.8
29.05	0.95	77.5
29.00	1.00	79.0

Heat-laden vapors formed by the boiling must be condensed and removed to maintain the vacuum for continued evaporation and further cooling. This is done by



FLOWSHEET of Heinz mash cooling. Live-steam heating of mash to 310 deg. F. in cooker requires approximately 25 min. Immediately following cooking, 3-in valve on bypass to condenser is opened. In 20 min., temperature drops to 240 deg. F. Then main 12 in. valve to condenser is opened to lower temperature, in next 10-15 min., to 150 deg. F. At this point, vacuum is released. Next, slurry is added to mash and two are mixed. By air pressure, liquid is transferred to drop tank, where after a malting interval its temperature is again dropped—this time in two stages—from 148 to 68 deg. F. First lowering, to 88 F., is by condenser only and takes 21 min.; second, by jet-booster, 20 min. Final vacuum, drawn by booster jet, is 29.76 in. Hg.

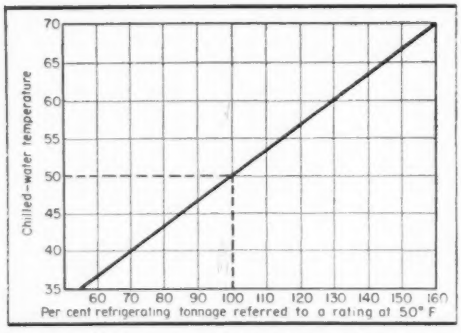


CHART 1—Variations in refrigeration capacity of an evaporator when water is cooled to different end-point temperatures. The lower the end temperature, the lower the absolute vacuum required, therefore the less the refrigeration efficiency. Conversely, a unit of 100 tons capacity at 50 deg. (see dotted lines on chart) will yield 130 tons at only 10 deg. higher end-point.

one or more steam-jet boosters, dragging moisture vapor from the evaporator and forcing it at increased pressure and extremely high velocity into the water steam of a barometric condenser.

If it is practical to recover the condensate, surface condensers are employed instead of the barometric type.

Capacity of a given steam-jet cooler, expressed as tons of refrigeration, varies with the temperatures at which cooling takes place. A unit that will chill, say, 100 gal. of water per minute from 45 to 40 deg. F. will have the capacity to cool approximately 120 gpm. from 50 to 45 deg. F. Thus, a 5-deg. differential changes capacity 20 percent (see Chart 1).

Conventional jet and condenser units designed for such applications as drying and concentrating by pan evaporation are not suitable for steam jet refrigeration. Efficient cooling by means of jet-vacuum evaporation requires equipment designed to meet the specific problem. Among the variables to consider are:

1. Rate of refrigeration or volume of product to be cooled per unit of time.
2. Range of cooling—initial and final temperature of product.
3. Characteristics of product.
4. Pressure of steam.
5. Supply and temperature range of available condenser water.

Here, amounts of steam at 100 psi. and water at 85 deg. F. required to evaporate 1 lb. of water vapor at varying pressures are shown in this table—

Suction Pressure (In. Hg Ab.)	Steam (Lb. Per Hr.)	Water (Gpm.)
0.10	110	25
0.30	80	9
0.50	75	5
0.75	70	4
1.00	65	3

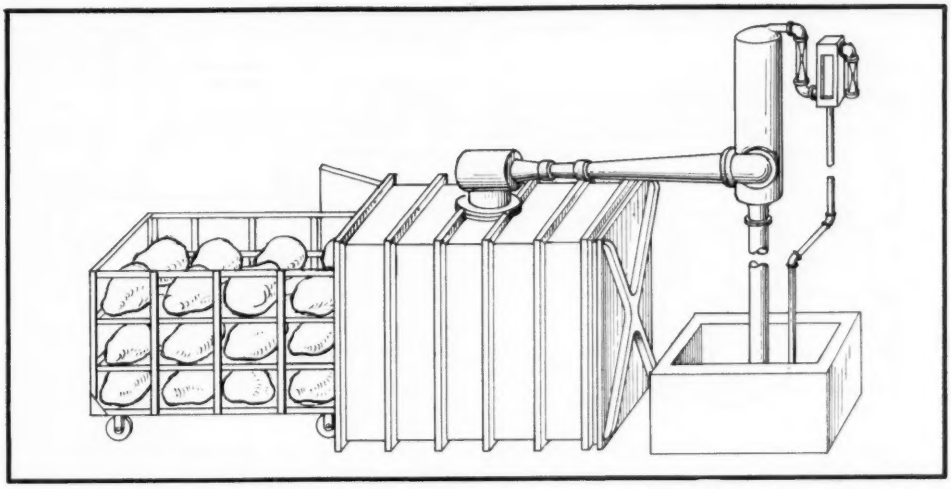
When designed for maximum efficiency, a system of cooling by steam jet refrigeration has these advantages:

1. Low cost of equipment per unit of material cooled.
2. Ejector-booster-condenser assembly can be erected at low cost.
3. Unit can be put in small space—in the plant, on the roof, or outdoors.
4. Jet assembly has no moving parts, therefore maintenance is at a minimum.
5. Capacity cannot vary due to wear or formation of scale, but remains uniform throughout life of unit.
6. System is easy to operate. And control may be manual—opening and closing steam and water valves and starting pumps—or entirely automatic via remote instruments.
7. Equipment cannot be damaged by overloading.
8. Once started, instrument-controlled operation is automatic and continuous, requiring only minimum attention.
9. Unit is safe.

Points on Costs

When steam is available for jet-refrigeration, equipment and installation costs are now. Overloading the unit is safe, resulting only in increased capacity at slightly elevated temperatures (see Chart 1). Since there is no wear and tear, capacity at a fixed temperature range is unvaried for the life of the unit. Freedom of the system from moving parts, other than the several pumping operations in some applications, cuts down maintenance.

Operating cost will vary (but not directly) with the Btu. of heat removed. Lowering by 10 deg. water which is at 60 deg. F. costs more than dropping the temperature of 100-deg. water to 90 deg. F. Therefore, the higher the range of temperature, the lower the operating cost.



VACUUM FUMIGATOR CHAMBER converted to high-speed cooler. In less than 1 hr., temperature of cooked chunks of meat is dropped from 200 to 40 deg. F. Centers of pieces are cooled amost as rapidly as surface.

On the other hand, vacuum refrigeration will produce near-freezing end-point temperatures in products not satisfactorily cooled by other means, and at a speed possible in no other way.

We now come to the five broad categories and specific installations cited at the start of this report—

A—Mash Cooling

Use of steam-jet refrigeration to cool vinegar mash affords two major advantages. First, it assures rapid cooling, an economical asset permitting increased production with the same equipment and labor. Second, it also permits instant interruption of cooling at critical temperatures—a control essential to assure quality and yield.

Let us observe how steam-jet refrigeration is employed in the manufacture of vinegar at H. J. Heinz Co., Pittsburgh:

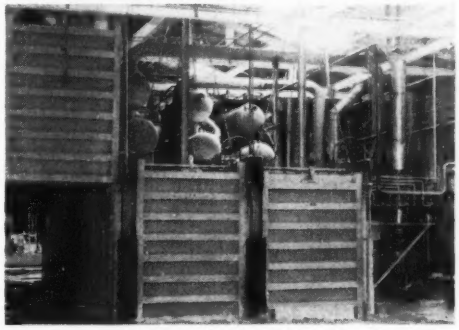
Ground corn and water are added to a vacuum-tight pressure tank in which mash is cooked to 305-312 deg. F., by live steam at 65 lb. pressure. Heating cycle requires between 35 and 40 min. (see recording instrument chart at top of second page of this report).

Cooking completed, the vessel is vented to an ejector-jet condenser for rapid cooling through evaporation. This temperature lowering is accomplished by first holding open, until tank pressure is dissipated, a 3-in. bypass around the main valve of the 12 in. line to the condenser. Bypass precaution is taken to prevent too vigorous agitation and carryover of mash to condenser, due to excessively rapid evaporation.

The ejector-condenser system plays a dual role. It knocks down all steam vapor so that none escapes to the atmosphere or fogs the interior of the vinegar plant. And through vacuum evaporation, it cools the mash from 312 to 150 deg. F.

Time interval for this cooling is approximately 35 min. Formerly, when heat-exchangers were employed, hours were required for cooling, the number dependent on the temperature of the circulating water.

As soon as the mash has been lowered to 150 F., ejector steam and condenser water are shut off by motor-operated pushbutton-controlled valves, breaking the vacuum tem-



VACUUM-REFRIGERATOR precools carload of lettuce from 70 to 33 deg. F. in 2 hrs. Coolers seen left, condensers overhead, compressors at right. (Monterey County Ice & Development Co.)

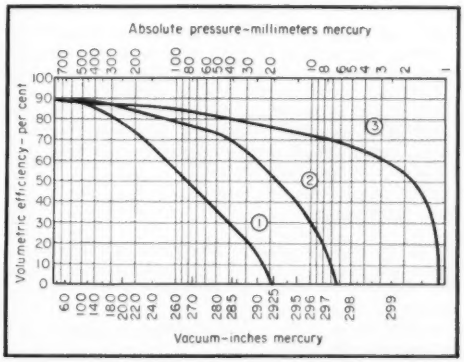
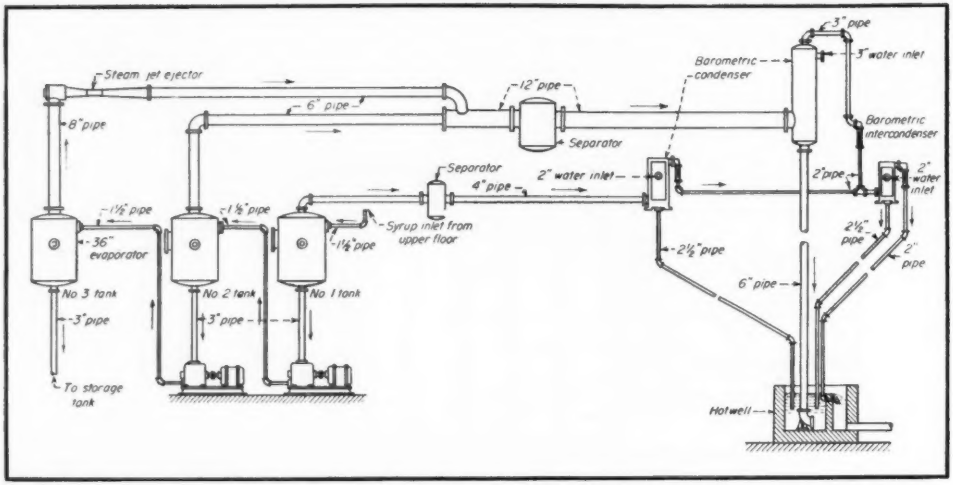
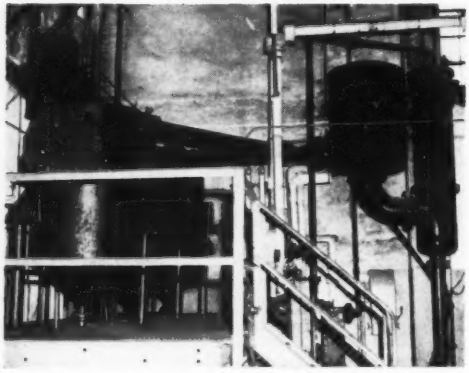


CHART 2—Performance efficiency of three types of mechanical compressors: (1) Conventional reciprocating pump, single stage; (2) conventional two-stage reciprocating pump; (3) single-stage oil-sealed rotary pump.



THREE-STAGE COOLER at Revere Sugar drops syrup from 190 to 80-90 deg. F., while concentrating from 64 to 67 Brix.



COMPACT SYRUP COOLER operates continuously 24 hr. per day at Revere, seldom requires operator attention.

porarily for the conversion of starch to maltose. This is brought about by introduction of a rye-malt slurry immediately following the return to atmospheric pressure.

During the next 30-45 min., corn mash and slurry are mixed. Then the contents of the cooker is transferred to a 5,500-gal. drop-tank, where final cooling from 148 to 68-48 deg. F. is completed. Timing of further processing, including fermenting, determines final temperature selected. Equipment is designed for cooling to 48 deg. F., the lowest temperature required.

Tank Built for Job

The specially constructed drop tank is engineered to expose a large surface area of the liquid for rapid evaporation. Employed is an internal perforated baffle plate which extends the length of the vessel, near its top. Mash drawn from the bottom of the tank is circulated by pump so as to cascade over the baffle.

Final cooling involves two steps. A drop in temperature from 148 to 88 deg. F. is produced entirely by one barometric condenser, water requirements of which are 550 gal. per min. at 70 deg. F. Drop takes about 21 min.

At 88 deg., the steam booster is cut in to complete cooling, which normally ends at 68 deg. F. A total of not over 40 min. elapses during this reduction of 80 deg. temperature in the drop tank. On the occasions when cooling to 48 deg. F. is advisable, an additional 40 min. is required.

Operating Data

When the booster ejector (which consumes 1,480 lb. of steam per hour) is turned on, pressure in the tank is reduced to approximately 29.76 in. of mercury (0.34 in. absolute). No additional water is required for the condenser, the 550 gpm. flow being ample for condensing both steam from booster and vapor from mash.

During the entire cooling cycle in the drop tank, air-ejectors are in operation. They consume 340 lb. of steam per hour, while the intermediate condenser in the air ejection system uses 15 gpm. of 70 deg. F. circulating water.

Speed of Steam-Jet Cooling

Before installation of jet refrigeration, a mash made from 5,000 lb. of corn was cooled from 150 to 70 deg. F. in a conventional coil-type heat-exchanger. The 70 deg. low limit was determined by the temperature of the circulating water in the coil. Time required for heat-exchanger cooling was 5 hr. during the winter months, 6 hr. in summer.

Now, steam-jet refrigeration cools 10 percent more mash, to a temperature 10 deg. lower, in only 40-45 min.

B—Products of Large Mass

Rapid cooling of liquids by any means is fairly simple compared to cooling solids. Lowering the temperature of the latter becomes a more and more complicated problem as the mass of the solids increases.

Cooling large pieces of cooked meat to a cold-storage temperature of approximately 40 deg. F. was a headache for one food processor before steam-jet refrigeration was installed to do the job efficiently and with despatch.

Method formerly employed was merely to cart the

chunks of meat to cold storage rooms. On entering, the temperature of the meat was 200-210 deg. F. in the center, slightly less at the surface.

In a number of hours the surfaces of the chunks were cooled to a safe temperature. However, centers of largest pieces remained warm even after 48 hr. in storage. Loss of quality and sometimes spoilage resulted.

New Method Safe

The steam-jet refrigeration system now in use drops the temperature of the cooked meat from 200 deg. F. to 40 F. within an hour. Temperature differential between center and surface of small pieces is 1 deg. or less at the end of the cooling cycle, and is not over 8-10 degrees for largest pieces.

Evaporative cooling takes place in a pressure chamber similar to the kind used for vacuum drying and vacuum fumigating. Into this enclosure is rolled a hand truck loaded with a charge of 800 lb. of cooked meat. The chamber door is then closed and sealed, after which vacuum is applied.

The ejecting system consists of a single booster (attached to the top of the chamber), barometric condenser, and 2-stage air-ejector. Steam required for both ejectors to sustain a vacuum of 29.75 in. (0.25 ab.) is 1,600 lb. per hr. The two condensers use 300 gpm. of water. Loss due to evaporation is 8-10 percent.

C—Leafy Vegetables

Vast changes for the better have been brought about in the method of packaging and shipping lettuce—and also in the quality of the heads on arrival at the market. These advances are the result of an innovation in the method of cooling lettuce heads immediately after harvest. Refrigeration by vacuum evaporation is credited.

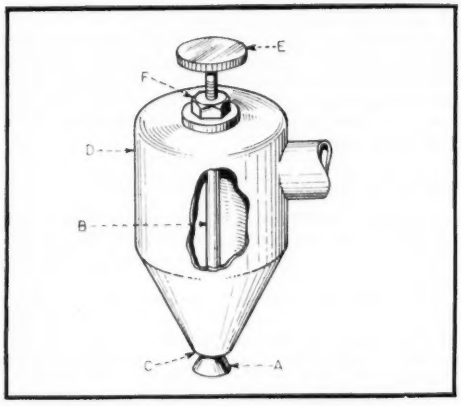
Installed at Monterey County Ice & Development Co., Salinas, Calif., such a system rapidly precools lettuce before shipping. No steam is employed in the operation, which lends itself admirably to applying fast-cycle refrigeration in plants without steam generators.

Harvested heads arrive at the plant crated and stacked, 18 crates to the pallet. To start cooling, pallets are transferred to dollys and trucked into one of three 7 ft. wide, 45 ft.-long vacuum chambers. Capacity of tunnels is 162 crates, half of a reefer-car load.

After doors are closed and sealed, pressure in the chamber is lowered by means of an oil-sealed rotary vacuum pump driven by a 40 hp. motor. The pressure drops to a final low of 29.8 in. of mercury (0.20 ab.), a vacuum beyond the range of reciprocating compressors (see Chart 2). At this pressure, surface moisture in the lettuce evaporates until the temperature of the heads is uniformly lowered to 32-33 deg. F.

Evaporation of moisture, equal to 2-3 percent of head

Simple Devices Turn the Trick

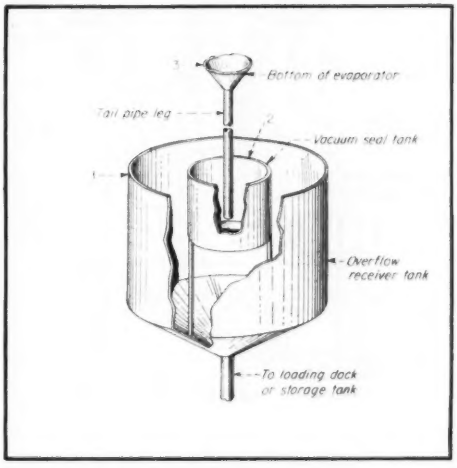


Special Nozzle Sprays Viscous Syrup

An easily made unit installed in the evaporators of the vacuum-cooling system at Revere Sugar Co. now delivers the viscous refined sugar syrup in an umbrella-like film—rather than a rope-like column as common with former sprayers. This is how the new nozzle was made:

First, from ¾ in. stock, a 90 deg. cone (A) was turned at the end of a rod (B) of sufficient length to pass through the outlet (C) of the nozzle casing (D) and extend an inch beyond the top. Next, the orifice was turned on a lathe to provide a surface paralleling the 90-deg. cone. A hole was then bored in the top of the casing and threaded. Threaded, too, was rod end opposite cone.

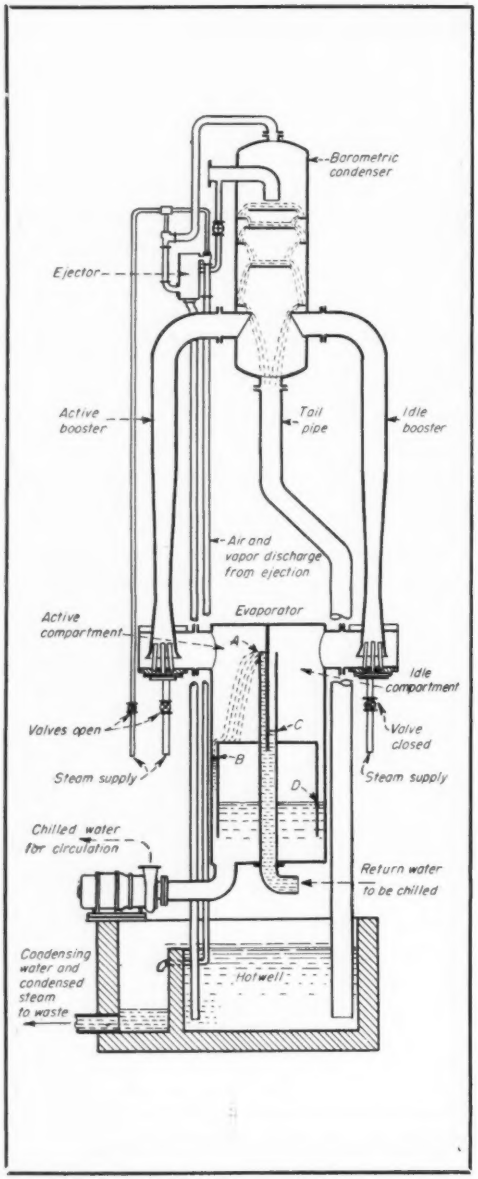
Now, by means of a wheel (E), welded onto the rod end, width of the passageway between cone and orifice can be regulated, to obtain the spray film desired. By tightening lock-nut (F), rod can be secured in place.



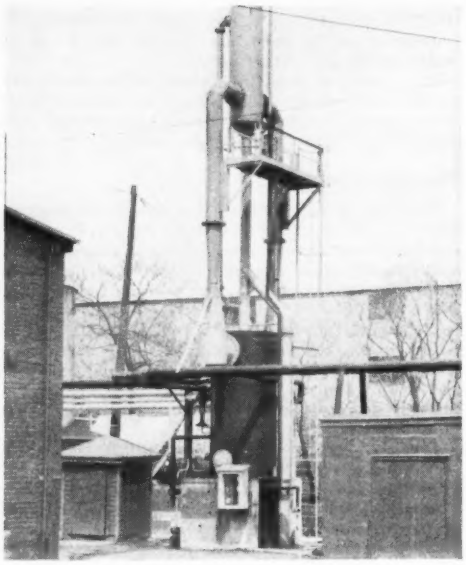
Gravity Drain From Vacuum Tank

By means of a receiving tank of special design, Revere's refined syrup is drained by gravity from an evaporator in which 29.2 in. of vacuum is maintained. Receiver was designed to employ the same principles as the tail-pipe leg and hot-well of the barometric-condenser system.

Inside the main receiving tank (1) is a second small tank (2) that functions as does the conventional hot-well. Syrup drained from the evaporator (3) overflows continuously from the small tank into the main receiver, and from there is distributed to loading dock or storage. Small tank is of sufficient capacity to hold ample liquid, after release of the vacuum in the cooler, for filling the tail-pipe leg when the vacuum is restored.



HOW TWO-BOOSTER unit at National Yeast Co., operates. Evaporator is divided into two compartments by partition. Differential between water levels (A) and (C), also (B) and (D), results from differential in vacuum drawn by condenser and booster when only one jet is active. Compartments are thus separated only by a self-adjusting column of water, which prevents condenser vapor entering active compartment. Pressure differential automatically ends flow of return water to inactive section, thus prevents heat pickup from condenser. No large isolating valve or other means is needed to prevent heating of water by return of vapor from condenser through idle booster. Sources of leaks are thus avoided.



NATIONAL'S EVAPORATOR is located in plant yard. It chills cooling-water from 85-90 to 55 deg. F., has capacity range from 75 to 150 gpm.

weight, is sufficient to produce the drop of approximately 40 deg., without impairment of quality.

To maintain a high vacuum in the cooler, the 2-3 percent moisture evaporated must be removed from the system before reaching the rotary vacuum pump. This is accomplished by condensers, (refrigerated by direct expansion of ammonia), installed in the suction line between evaporators and pumps.

Benefits of Method

Precooling rapidly to low temperature by vacuum evaporation has inherent advantages over other cooling methods —advantages that spell savings in packaging costs, shipping expenses, and labor.

Top icing, which formerly required between 60 and 80 blocks of ice per car, is now avoided. So is the labor of crushing and handling this ice. In addition, the space formerly occupied by crushed ice can now be filled with product.

Since lettuce heads cooled by vacuum evaporation are free of water and surface moisture, and since water from top icing is now avoided, dry heads can be packed in paper cartons. These containers not only provide greater product protection, but also cost less than crates, are easier to handle, and require no waxed paper liners.

Steam-Jet Refrigeration, Too

Other plants in California are cooling lettuce in crates or cartons, using steam-jet vacuum for evaporation. One of these systems, in the plant of Vacuum Cooling Co., also in Salinas, does its cooling in 7½-ft. dia., 50-ft. long cylinders. By steam-jet evacuation, final pressure is reduced to 29.7 in. of mercury (0.30 ab.). From the start of loading a cylinder to completion of unloading, the cooling cycle requires 1½ hr.

Refrigeration of heads is a 3-stage operation. After a cylinder is loaded and closed, a primary steam-jet system

lowers pressure to 28 in. Hg. Then the system is closed off and a high-vacuum booster system cut in to further drop pressure to 29.7 in. Hg. During this stage, vacuum is held at the 29.7 in., and pressure is maintained for 25 min.

When cooling is completed, a valve is opened to another cylinder just loaded and closed. This lowers the pressure in the starting chamber to 15 in. Hg. and at the same time reduces the vacuum in the finished cylinder. This final operation on the refrigerated cylinder likewise constitutes the first stage of the 3-stage cooling operation on the chambers just loaded.

East Coast Method

In New Jersey, a steam-jet refrigeration system has been applied to cooling not only lettuce but also other leafy vegetables such as spinach and cold slaw. These are successfully cooled in cellophane bags enclosed in shipping cartons.

Perforations in the bags and openings in the cartons provide rapid exit of evaporated moisture.

It is to be noted, however, that this method has not been applied succesfully to fruits and vegetables having small surface areas in proportion to mass.

D—Hard-to-Cool Viscous Liquids

Sugar refiners face knotty problems in cooling viscous refined syrup with shell-tube or coil-type heat-exchangers. When it is necessary to lower 64 Brix syrup rapidly from a high of 190 deg. F. to a low between 80 and 90 F., troubles increase. As the temperature of the liquid goes down, Brix goes up, so does viscosity. Hence, circulation and rapid removal of heat becomes increasingly more difficult. At best the cooling cycle is sluggish in proportion to the equipment involved.

However, at Revere Sugar Refinery, Charleston, Mass., cooling of syrup is no such problem. Here, 34 gpm. of 64 Brix refined syrup are continuously chilled 24 hr. per day from 190 to 80-90 deg. F. by steam jet refrigeration.

Some users of refined syrup prefer to have the product delivered hot. Others, such as ice cream manufacturers, require it cooled. Steam-jet refrigeration has proved an economical and trouble-free method of cooling hot syrup to delivery temperature for the bottlers, ice cream makers, and others.

Employed is a 3-stage system in which syrup is pumped from the bottom of one evaporator and sprayed in at the top of the next. Nozzles of special design are necessary to generate a spray film with ample surface and proper degree of fineness (see first item in special panel, "Simple Devices Turn the Trick").

For circulation in the refined syrup system, as well as in the vinegar mash layout, pumps must be selected with a suction head which can be maintained in excess of the vacuum required in the evaporators.

Discharge from the last evaporator is by gravity. Employed is a special method for removal of the syrup against negative pressure in the evaporator (see second item in special panel).

Initial negative pressure of 27.20 in. Hg (2.8 ab.) is produced in the first evaporator by an air ejector and small barometric condenser. Temperature in this stage is lowered from 190 to 120 F.

A single booster evacuates in both the remaining stages, which use, in common, one barometric condenser. Latter is augmented by air ejectors and a small interchange barometric condenser.

Vacuum in the second evaporator is held at 28.6 in. Hg (1.4 ab.) and in the last at 29.2 in. (0.80 ab.). Condensers use a total of 150 gal. of circulating water per minute. Steam consumption of jets is at the rate of 415 lb. per hr.

As syrup is cooled, Brix is raised from 64 to the desired end-point of 67. At this sugar concentration the sea-level boiling point is 219.4 deg. F. Vacuum required, therefore, is higher than necessary for cooling pure water to the same temperature.

Once started and set for a fixed performance, the jet-refrigeration system at Revere operates continuously, month after month, without supervision other than that necessary for checking and oiling pumps and motors. Rate of cooling is controlled by the size of the special spray-nozzle openings, which can be adjusted for maximum performance.

E—Well-Water Compensation

At National Yeast Co., Belleville, N. J., where 1,000,000 gal. a day of 55 deg. F. water was required for cooling fermenters in the processing of yeast, a necessary increase in capacity called for an additional 200,000 gal. After use in processing, the cooling water had reached 85 to 90 deg. F. and was discarded.

To obtain the needed, extra, cold-water gallonage, more deep wells were drilled on available areas, but the additional cooling water was not forthcoming.

In the process, air for fermenter agitation and yeast growth is produced by huge turbo-blowers, some with capacities as high as 18,000 cfm. These heat the air supplied to the fermenters to approximately 120 deg. F.

Heat is partially removed enroute to tanks by passing the air over cold water coils. In addition, fermenting liquid in the beer tanks is cooled by a multitude of cold water coils.

So, if the plant capacity was to be expanded to meet needs, an additional source of 200,000 gal. of 55 deg. water was essential. Recycling of the necessary gallonage of spent circulating water, cooled from the discharge temperature of 85-90 to 55 deg. by steam-jet refrigeration, was the economical method National used to overcome this difficulty.

The following notes on the equipment indicate how simply it operates.

Jet refrigerating assembly, located outdoors in the yard of the plant, is supported on its own simply constructed foundation. The cooling unit has no moving parts.

Auxiliary equipment includes two pumps, one drawing cooled 55 deg. F. water from the evaporator at the rate of 150 gpm., the other supplying 80 deg. F. condenser water at 637 gpm.

Of barometric-condenser type, the refrigerating system employs two boosters, each of which draws a vacuum on its own separate section of the evaporator.

A mulitple-booster type refrigerator has several noteworthy advantages. The system can be operated to function as several separate units. End-temperature is determined by the vacuum drawn but, since the rate of cooling differs according to the number of pounds of steam per hour, issuing from the ejectors, multi-booster construction permits varying the capacity with a corresponding saving in steam. This is done by closing off one or more of the jets.

Full-capacity steam requirements at National Yeast Co., for operating two air ejectors and two jet-boosters to a refrigeration equivalent of 187.5 tons at 55 deg. F., is 2,700 lb. per hr., at 150 psi. pressure. This consumption represents a steam cost of approximately 0.60c. per 1,000 gal. of water cooled from 85-90 to 55 deg. F.

PROBLEM BEATEN. Clouded wine is seen on right, clear on left. A long-standing problem, wine clouding by metal contamination is eliminated by new Fessler Compound.

New Clarifier Removes Metals From Wines

Precipitates copper and iron to solve clouding problem. Is completely removed, by settling or filtering, and does not impair wine quality

FE STAFF

A remarkable new discovery is a fining agent which removes all traces of unwanted copper and iron from wine.

Known as the Fessler Compound, after its inventor, Julius H. Fessler of the Berkeley Yeast Laboratory, Berkeley, Calif., this material solves the problem of wine "metal casse," or objectionable clouding.

And its ability to do the job commercially is now being demonstrated —successful tests having currently been run over several months, including treatment of more than 100,000 gal. of wine at six California wineries under inspection of the California Department of Public Health.

Also, it is now being tried with fruit juice and vinegar, in which fields it is proving equally affective in banishing metal clouding.

Besides its clarifying action in the wine, the agent itself. . .

—flocculates or precipitates from the product promptly and completely.

—does not add to or remove anything from the wine proper.

—and has no depreciative effect on wine quality, even when added in larger quantities than specified.

Still another advantage of the compound over other treatments for metal removal is that no wines are lost as unusable lees, as occurs in some fining methods. Also, wines may be filtered immediately after treatment, with no need to wait a number of days for all precipitate to settle.

A triangular taste study has indicated that no significant taste change results from use of the compound, even when it is employed in an amount ten times greater than that required for metal removal.

To brief the picture of the problem, metal contamination has a delayed effect on wine which depreciates original aroma, flavor, color, stability, and shelf life of the product. Principal metals involved in such contamination are copper and iron. And mechanical advances in winemaking in the last 20 yr. have produced additional sources of metal pick-up.

It was not until several years ago, however, that it became evident to winemakers that metal contamination was seriously affecting product quality. The problem was then highlighted when the consuming public increasingly refused to accept cloudy wines.

In truth, it was frequently difficult for the technologist to recognize metal contamination in wine until its effect was fully evident. Then it often was too late to correct the damage. Many times a wine would appear brilliant and stable when bottled and not show cloudiness or sedimentation until it reached the market.

At first, iron rather than copper was thought to be the principal cause of clouding. As a result, the industry adopted the classical German blue-fining procedure for correction of this "iron problem." In blue-fining, iron and copper are precipitated from the wine, under controlled conditions, by adding potassium ferrocyanide.

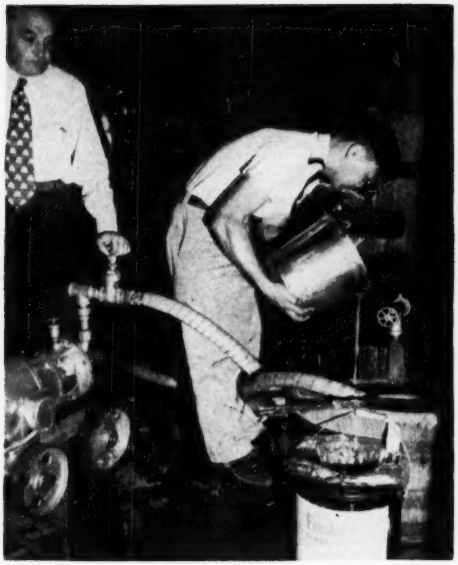
But this method does not prevent recontamination by metal. And since filtering and bottling equipment used was generally made of copper-bearing alloys, recontamination often occurred.

Further research then established that copper was the major culprit, and that any amount of copper contamination, no matter how slight, renders a wine susceptible to metal casse.

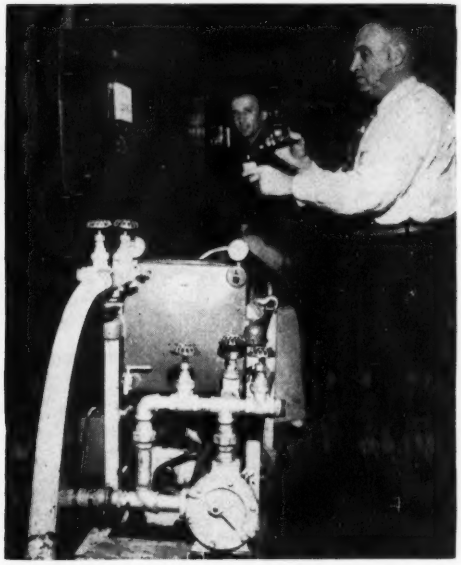
Equipment Is Eyed

At first glance, the answer to the problem appeared to be the complete removal of all copper and copper alloy equipment coming in contact with wine. Since this was economically unfeasible, many vintners met the situation halfway. That is, they used the blue-fining method at the processing point where the wine is held in storage tanks—and from that point on employed stainless steel pumps, pipes of glass or stainless, and stainless bottling equipment.

As indicated, however, blue-fining



ADDING clarifying compound to wine as it flows into oak tub from tank. Wine is pumped back into tank, recirculation effectively mixing the clarifier with the wine.



FILTERING treated wine to remove precipitated metallic contaminant and treating compound. Winemaker at Paul Masson plant inspects filtered sample of wine for clarity.

is not always successful. Copper content of wines must be less than iron content if it is to be entirely removed. A residual 2-3 ppm. of iron is left in solution in the wine after the blue-fining process is completed to insure absolute freedom from the potassium ferro cyanide fining agent. Copper content equal to or above iron content cannot be removed without removing all iron also.

From 5 to 10 days are required for the blue-fining reaction to go to completion. Unless supervised by an experienced technologist, there is danger of overfining, with resultant prussic acid traces in the wine and a bitter almond odor.

Because of this hazard, blue fining does not have an official standing, although it is commonly used.

Facts on New Agent

The Fessler Compound is a partial complex of potassium ferro cyanide, ferrous sulfate, sodium hydroxide, and citric acid. It is a reagent which complexes the soluble metal contaminants into their insoluble form at a pH of 7 or lower. In appearance it has a creamy texture and is brownish in color. When added to wine, it disperses easily. It is packed in glass or lined metal containers.

One gallon of compound removes approximately 0.5 ppm. of metal per 1,000 gal. of wine. The average amount of metal found in wine amounts to 1.0 ppm., and a corresponding percentage of compound is added. Cost of the compound per 1,000 gal. of wine varies from $1 to $4, depending upon the metallic content and amount of compound necessary to remove it. Cost per gallon of finished treated wine accordingly ranges from 0.1c. to 0.4c.

When the compound is added to wine, it combines with the metal in solution. Since the compound itself is insoluble, it carries all copper and iron with it when it settles or is filtered out. It is generally added in the final storage tank as the last step in the process before polish filtering.

Because the wine can be recontaminated, glass, stainless steel or rubber equipment is employed after it has been clarified by the compound.

In operation, the correct amount of compound needed to remove the individual wine's metallic content is determined by laboratory test. The compound is then slowly added to the wine in the storage tank. No temperature change is required to bring about the reaction. The compound and wine are agitated to insure complete dispersal—manually by paddle in small casks, by pumps or compressed air in large tanks.

Action of the compound brings flocculation in the wine immediately. And the precipitate can be settled out in an average-size tank overnight, or in a 100,000-gal tank in 5 to 10 days.

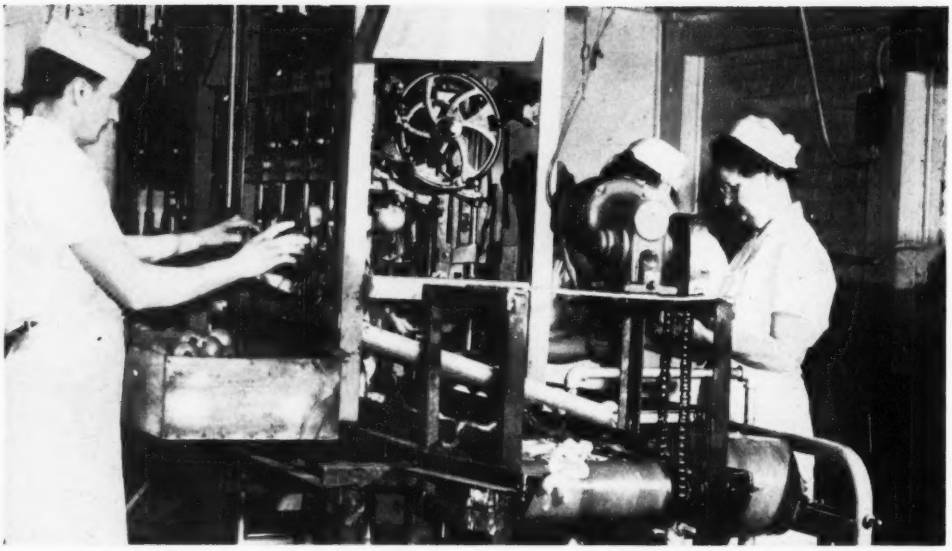
But it is unnecessary to wait for settling. Since the compound and metals are now combined in insoluble form, they can be filtered off at once in the polishing filter or by filter press.

Test Details

The Fessler Compound is now undergoing a one-year trial period in California under the direction of the California Department of Public Health. Stringent rules are in effect regarding its use. A qualified food technologist or chemist must be in attendance and analyses of the wine made before and after fining with the compound. Further, full records of each fining operation must be kept and reports made to the authorities.

Tanks or vessels used in fining wine with the compound are plainly marked, and any lees remaining from treated wine are destroyed. Tanks in which wine was treated must be washed with a 1 percent soda ash and alkali solution and then thoroughly flooded with fresh water. Wash water from these tanks is chemically analyzed by Hubach test, which detects the slightest trace of cyanide or compounds.

All indications to date point to the success of the compound and its acceptance for general use.



KEY to curbing losses in peeling of fruit is selection of larger, more uniform apples. Other factors are choice of proper-type paring and coring machine and periodic adjustment of knives. (Wagner Baking Corp. photo)

Selecting and Processing Apples *For Top-Quality Pies*

PART I—Getting and Storing the Best

Prime considerations are variety, size, maturity, flavor, texture, keeping characteristics—and particularly baking factors... Working data given on checking and analyzing, also boosting of yields and minimizing of losses

LOU BISNO

Bakery Chemist and Production Consultant, Burbank, Calif.

Care is paramount in the selection of fresh apples if superior pies are to be baked. For, if proper varieties are not procured, storing difficulties will arise. Moreover, improperly selected fruit will bake poorly and crusts will suffer.

Equally important is the choice of properly mature apples, which are uniform in size and shape—because any variations in these characteristics will accentuate peeling losses and increase labor costs.

First, a few basic facts: Apples are the most important of tree-fruit food products. Because of their availability in large quantities in the U. S., they are extensively used as fresh fruit and in numerous other ways.

Of an average annual world crop of 500,000,000 bu., roughly 70 percent are for other purposes than cider.[1]

A particular use of apples is in pies—an outstanding dessert in this country. Indeed, the apple pie enjoys leading popularity, despite the modifying effects of seasonal and local conditions.

Climate (rainfall and temperature)

Whole Fruit to Slices to Filling

How to assure excellence in apple-pie fillings is detailed in this special two-part article.

Here in Part I, ways of procuring and keeping the fruit are covered, with emphasis on proper selection in order to hold down costs yet get greatest yields.

The concluding Part II—"Preparing Them for the Pastries"—will highlight peeling, coring, inspecting, slicing, brining, sugaring, draining, and juicing operation. And prevention of spoilage will also be accented.

and soil composition and drainage are extremely important factors bearing on the yield of apples and influencing their quality relative to palatability, storage, and baking characteristics.

Proximity to markets obviously is of prime consideration. The northeastern section of the U. S., bounded west and south by the Mississippi River and the northern borders of Tennessee and North Carolina, encompasses half the country's population and produces approximately the same proportion of the apple crop. Here, conditions are most conducive to apple growing, hence it is not surprising that a number of varieties have been profitably developed, grown, and commercially exploited in this area.

The performance of the apple pie in outrunning other types in sales is more pronounced in the northeastern U. S. than in the west coast apple areas, likely attributable to the more limited choice of apple varieties on the west coast and the greater availability there of other pie-making fruits.

To be acceptable for pie making, apples must be uniform and low priced. They must also come from dependable sources, withstand storing over a reasonable period, and then hold up well in baking. The eating quality of an apple pie depends upon the variety, maturity, and freshness of the fruit, together with the method of processing and subsequent handling of the finished pie.

Important Factors of Variety

A number of pertinent factors—many bearing on quality—are associated with variety of the fruit. Among them are availability, flavor, texture, size, shape, cost, storage quality, and behavior during baking. Summer varieties are normally more astringent, higher in moisture and acid contents, and lower in pH values and sugars than those available later in the season. Early varieties tend to bake poorly, and they do not hold up as well during storage.

To have good baking quality, an apple pie must remain in the oven long enough to form a satisfactory crust. And the apple slices should not break down and release their juice. If the juice boils out, the crust sticks to the baking plate and the pie becomes soggy. Moreover, early varieties frequently distort the crust during baking. Obviously, this has an adverse effect upon the uniformity and attractiveness of the pie.

In general, winter varieties have more acceptable baking properties. Also, they are available over the required period—until the next season's crop is ready.

How They're Classed

Apple-pie varieties are classed in three groups—the early apples, medium-keepers, and long-keepers. Early apples comprise the Duchess, Williams Red, Gravenstein, Yellow Transparent, Starr, and Codling. Medium-keepers include the Wealthy, McIntosh, Cortland, Grimes Golden, Black Twig, Stayman, Red Delicious, Golden Delicious, Northern Spy, Winter Banana, and York Imperial. Long-keepers consist of the Stark, Baldwin, Gano, Winesap, Ben Davis, Willow Twig, Rome Beauty, Northwestern Greening, Rhode Island Greening, and Albermarle Pippin (Yellow Newtown).

Classification of the apples into the three major groups is somewhat arbitrary. It is based on the period of availability, analytical findings, and storage and baking properties. Analytical data covering 5 summer, 2 fall, and 18 winter varieties will be found in Table I.

Varieties in the early group have a limited storage life. They are usually held for a maximum of only several weeks. Further, their slices tend to swell during baking. The cells rapidly rupture and release their juice. And with loss of juice and acid, the crust raises and the flour gluten toughens. In extreme cases, a lop-sided top crust forms.

The later apples are more stable during baking. While some of these varieties have excellent keeping qualities, local differences may be found. Growing and handling conditions vary to such an extent that a variety rated as a long-keeper in one section of the country may be only a moderately good-keeper in another.

For example, the end of the storage season for the California-grown Rome Beauty is February.[a] However, when grown in the Shenandoah Cumberland Valley, this variety holds up well in storage until April 15.[a]

In cases where an orchardist has unusually good natural growing conditions for a particular variety and handles his crop with care, what would normally be a medium-keeper may become a long-keeper. Data in Table II illustrate the overlapping in the properties of apples other than the early varieties.

Also noteworthy is the fact that in years of exceptionally short crops keeping qualities of a particular variety may be unusually good. This is possibly attributable to a "killing off" of the poorer fruit under the adverse conditions.

In eastern and central markets, the large number long-keeping varieties available leaves the commercial user of apples for pies considerable choice. On the west coast, there is chiefly one long-keeper—the Yellow Newtown. When mature, this variety is quite firm relative to baking. The writer observed that this variety required a long baking time—90 min.—in a commercial pie bakery. This is a condition which is costly, since it slows down production.

Once apples are purchased for storage, separating them into approximately the same degree of maturity and using the fruit at the optimum

Analyses and Yields Compared

TABLE I—COMPARATIVE ANALYSIS of Summer, Fall, and Winter Apples*

Type of Apple	Water (Percent)	Solids (Percent)	Acid (As Percent Malic)	Invert Sugar (Percent)	Sucrose (Percent)	Total Sugars (Percent)	Ash (Percent)
Summer	84.86	15.14	0.74	6.92	3.30	10.22	0.31
Fall	84.78	15.22	0.50	7.29	4.27	11.56	0.22
Winter	83.25	16.75	0.58	8.17	4.08	12.25	0.26

* Winton, A. L. and K. B., *The Structure and Composition of Foods, Vol. II*, John Wiley & Sons, Inc., 1935.

TABLE II—ANALYTICAL DATA on the Early Varieties, Medium-Keepers, and Long-Keepers

Variety	pH	Total Sugars (Percent by Refractometer)
Early	2.90 - 3.10	9.0 - 10.0
Medium-Keepers	3.30 - 3.75	10.0 - 15.0
Long-Keepers	3.60 - 4.00	10.0 - 15.0

TABLE III—YIELD OF SLICES per Pound of Apples Is Greater for Larger Size Fruits

Dia. of Apples (In.)	Approx. No. of Apples Per 100 Lb.	Lb. of Slices Per 100 Lb. of Fruit	Lb. of Apples to Produce 100 Lb. of Slices	No. of Apples to Produce 100 Lb. of Slices	Relative No. of Apples for Same Amount of Slices
2¼	640	57	175	1,120	438
2½	465	70	143	665	260
2¾	350	77	130	455	178
3	270	82	122	329	128
3¼	215	84	119	256	100

period will eliminate a number of the ordinary problems.

Because of the problems pertaining to uniformity, storage losses, equipment space, processing, waste disposal and attendant labor costs, numerous bakers purchase fresh, ready sliced apples in order to short-cut plant operations.

However, the labor costs as well as storage and processing losses can be controlled by: (1) Storing each variety of apples in separate lots, (2) eliminating wide variations in the maturity of the fruit, (3) selecting only the larger apples (3 in. and up), and (4) carefully discarding defective, wormy, rotten, and heavily bruised fruit.

Common Problems

As a guide when purchasing apples, it is advisable to pressure test, maturity grade, and plan when the specific lot of fruit is going to be removed from storage and used.[4]

When apples of widely varying maturity are used, difficulties occur at the apple machines and during baking. Consider, for example, the Rome Beauty. This apple is very mealy if the reading is as low as 8 or 9 lb. on the Ballauf pressure tester.[4] When as soft as this, the apples cannot be handled by the paring machines because they break apart. Thus, operations are slowed down.

If apples are stored as late as June or July, "stewing" or boiling out of the fruit frequently occurs during baking. Upon examining these apples prior to peeling, either the readings on the pressure tester are low or they vary considerably. Softer apples will

(Turn to page 181)

• • •

How To Remove Hazard From Safety Controls

Simple precaution eliminates danger of unexpected motor start-up because of ground or short-circuit

H. E. MUELLER

Chief Electrician, Acme Brewing Co., Los Angeles, Calif.

Sometimes a so-called "safety" device may increase the hazard by creating a false feeling of security.

As an example, we see "Stop" buttons or similar controlling devices on machines that are remotely or automatically controlled. These switches are for the purpose of protecting the maintenance or repair men in their duties.

Where such control devices operate a magnetic motor starter, the starter can close unexpectedly because of a ground or short-circuit in the control wiring.

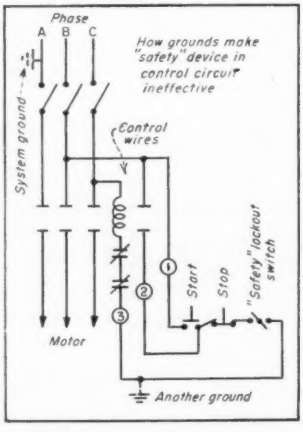
This is illustrated by the accompanying simple "Start-Stop" wiring diagram of a three-phase motor starter. Should there be a ground in the distribution system on phase A (or *B*), a ground at any point on control wire 3 completes an electrical circuit through the operating coil of the starter to phase *C*. Then the starter closes and, unfortunately, will not open even when the "Stop" button is pressed since this button is shorted out. Should the ground develop on wire 2, holding the "Stop" button depressed will open the contact circuit and drop out the starter.

A breakdown of the insulation of the control wiring or devices as a result of moisture or the like will cause the starter to close similarly.

There still is only one way to be safe when approaching a motor-driven machine to work on it. That is to open the disconnecting means provided ahead of each starter. This is particularly true of magnetic starters.

Switch in Motor Leads

Sometimes this entails extra work and inconvenience, since the switch may be some distance away. In such cases, the answer is an enclosed, no-fuse, quick make–quick break, disconnecting switch of suitable horsepower rating wired into the motor leads and located at a convenient point on the machine.



DANGER of unexpected motor start-up —and injury of machine operator or maintenance man—because of electrical ground in starter circuit is indicated here.

This switch should have an extra blade, or on large sizes, an interlocking switch that is wired into the control circuit to prevent the starter from being closed at its normal starting location while the disconnecting switch is open. Without this protection, it would be possible to have full voltage on the disconnecting switch when it is closed.

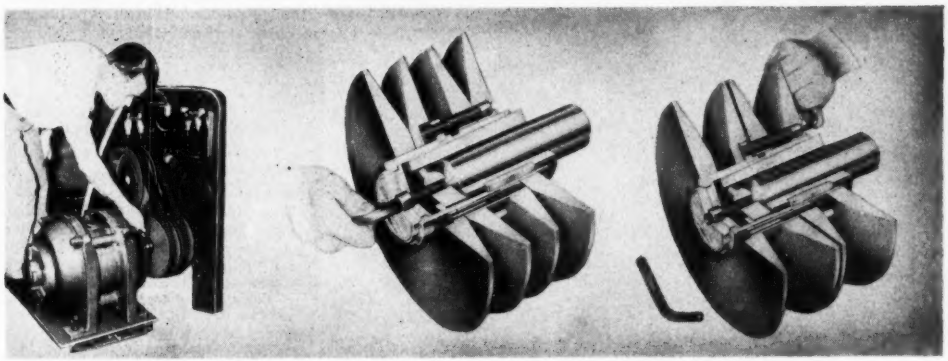
The use of a control voltage and circuit independent of the distribution-system voltage gives greater assurance of correct operation of automatic and hand-operated control devices and minimizes the possibility of a magnetic starter closing accidentally. This is provided by using small transformers on each starter which provide: (1) Generally a lower voltage on the control circuits and consequently less chance of insulation break down on controls. (2) Complete isolation of the control circuit from distribution-system grounds.

Good Safety Investment

Many manufacturers now provide starters, in all sizes, wired with a separate control and complete with a suitable transformer. It is an inexpensive and worthwhile investment to make on any starter whose positive operation is essential.

A 50-va. transformer will handle up to a Size 1 starter. Minor reconnections in the starter and changing the starter operating coil to the reduced voltage are all that is required. A transformer ratio to lower the separate control to 110 v. is good practice. On 220-v. distribution systems, separate control advantages are commonly obtained by using a 1/1 transformer, thus making the change of the starter operating coil unnecessary. The reconnections within the starter will, of course, still be necessary.

NEW EQUIPMENT & SUPPLIES



Speed Changes Made Quickly, Easily With New Drive

Engineering features in four units which comprise this new, variable speed drive are reported to cut down-time on speed changes and increase production.

Components of drive are: A variable pitch motor sheave; a set of wide range belts; a companion sheave; and a slide motor base. The Taper-Lock principle is used in the bushing for both sheaves in the drive and contributes greatly to the rapidity and ease with which speed changes can be made. Drive is termed compact, the sheaves occupying a minimum space on the shaft.

The variable sheave assembly locks on the motor shaft as a unit with turn of a screw (see illustration).

Pitch diameter is stated to be changed easily and positively by means of a one-point adjustment. The single adjusting screw may be located at either end of the sheave. Normally, the sheave is factory assembled with adjusting point located on the motor side. Pitch diameter can be set with high accuracy and cylinder speeds held to close limits.

Belts are of the latest design "R" section and have deep side walls to help insure long life. Transverse ribs provide greater lateral rigidity. Belts are oil-proof, heat-resistant, and static conducting.

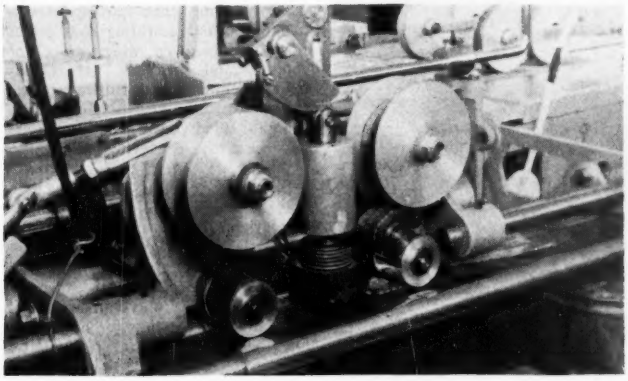
Precision-grooved companion sheave in the drive is factory balanced and, being held firmly to shaft by bushing, runs true. It is of simple, modern design, and for safety has no projecting parts. In rare cases where a change in companion sheave is necessary, the lock principle simplifies the task of making the switch.

Slide motor base permits changes in center distances to preserve proper belt tension when the variable pitch sheave is adjusted for the desired different speeds.

Base is rugged all-steel construction. A full range of centers is provided with an easy turn of one screw. Compact and of flush design, the base is available in full range of sizes for NEMA frame motors—*Dodge Manufacturing Corp., 2800 Union St., Mishawaka, Ind.*

Circle 117A on Reader Service Card

Wrappers Imprinted by Automatic Unit



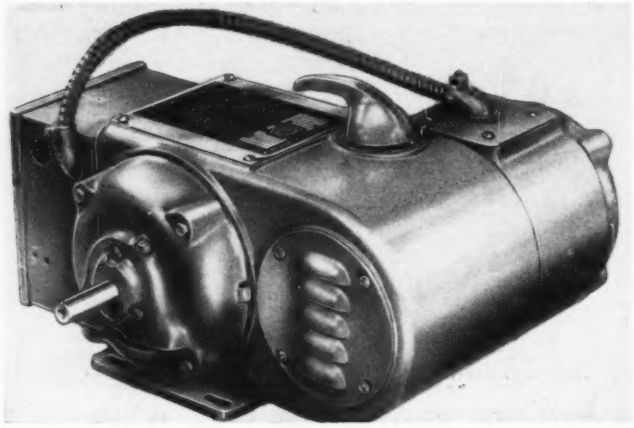
Attached to the packaging machine, this "Rainbow" Trans-leaf coder automatically imprints cellophane, glassine, waxed paper, foil, tissue, and similar wrapping material.

Imprinting can be done in all colors. Maker states there is no waste, no messy ink, and minimum maintenance. Synchronized with packaging-machine speed, unit accurately prints quality control number, prices, and other data. Impressions are reported clear and color rich.

In imprinting operation, roll leaf is fused into surface of material. Brass or steel type used is stated to last for thousands of impressions.—*The Industrial Marking Equipment Co., Inc., 454 Baltic St., Brooklyn 17, N. Y.*

Circle 117B on Reader Service Card

Fractional-Hp. Vari-Speed Motors Employ 110 or 220v.



A new development in single-phase, fractional-hp., variable-speed motors permits use of 110 or 220v.

New unit, designated as Type VA-C Varidrives made in ¼, ⅓, ½, and ¾-hp. sizes. Compact and light in weight, motor provides speeds in a 10:1 ratio, from 4 to 10,000 rpm.

By turning a convenient control dial, motor's speed can be instantly changed without stopping. Eliminated is need for an external speed changing device or gear box. Unit occupies little more space than a standard fixed speed motor.—*U. S. Electrical Motors Inc., Box 2058, Los Angeles 54.*

Circle 118A on Reader Service Card

Porcelain Equipment Has Glass-Fiber Plastic Armor

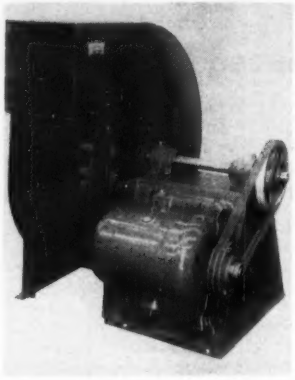
Tufclad is the name given to a new line of chemical porcelain armored with glass fiber-reinforced plastic.

The protector is applied in the form of multiple layers of heavy glass fiber-woven cloth impregnated with a special modified phenolic resin of high adhesive strength for bonding to porcelain and between layers of cloth. Jet black in color, the oven-cured armor shell fully covers porcelain, running end-to-end and under flanges.

The resilient armor shell is stated to cushion hard impacts as well as to insulate porcelain against thermal shock. And shell holds operating line pressures against gross leakage even though porcelain is cracked or broken. Telltale leakage will signal damage, while safety of personnel and product are assured by temporary control.

Armoring is regularly available on Lapp's ½-to-6 in. standard Y and flush valves, and pipe and fittings for them, also on plug cocks and safety and flush valves, and their pipe and fittings in ½-to-8 in. range. In addition, armoring is readily adaptable to special shapes—tower sections, nozzles, covers.—*Lapp Insulator Co., Inc., Process Equipment Div., Le Roy, N. Y.*

Circle 118B on Reader Service Card



Industrial Fan Handles Air, Granular Materials

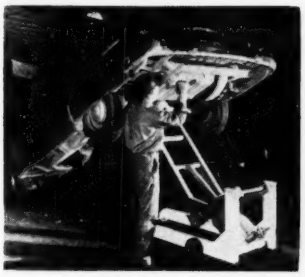
This rugged industrial fan is built with either air or materials handling wheel. It is made in eleven sizes with capacities ranging from 670 to 44,000 cfm. and pressures up to 16 in. water gage.

Air handling wheel has backwardly-inclined blades featuring low power consumption over wide range of volumes and pressures. It is particularly suitable for exhausting smoke, fumes and light dusts. Heavy-duty, straight-bladed wheel is recommended for use in the conveying of granular materials.

Standard accessories for fan include both bolted and quick opening-type access doors, flanged outlets and inlets, and outlet dampers. Available with a variety of special coatings, it can also be built of special metals to meet explosion-proof or anti-corrosive specifications.—*Westinghouse Sturtevant Div., 200 Readville St., Hyde Park, Boston 36, Mass.*

Circle 118C on Reader Service Card

Compact Hoist Saves Mechanic's Time



Up to 50 percent of mechanic's time is claimed to be saved by raising each job to best and most convenient working height with use of this air-operated one-end lift for automobiles or trucks.

Hoister is made in two models, 3 and 5. The first, for cars, has a lifting capacity of 3,000 lb., the latter, for trucks, lifts 5,500 lb. Unit is recommended for all under-chassis repairs; undercoating; steam cleaning; fender, body and brake work; and front-end repairs.

Fully portable, hoister can be used on upper floors, outdoors, or anywhere within reach of an air hose. Best air pressure is 120 lb., but a minimum of 80 psi. is required to operate.

Unit features an automatic safety lock designed to firmly hold the lift at any one of its ten working heights. Compact unit, up-ended for storage, occupies approximately 30 sq. in. of space.

Model 3 measures 30 x 67 x 28½ in. It has a total lift of 53 in. and weighs 315 lb. Model 5, 34 x 70 x 33¾ in., lifts 50 in. and weighs 550 lb.—*Hypressure Jenny Div., Homestead Valve Mfg. Co., P. O. Box 715, Coraopolis, Pa.*

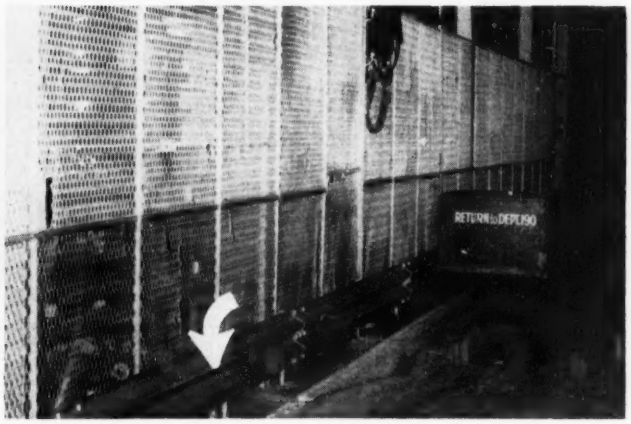
Circle 119A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Beam-Type Rail Protects "Bump-Spots"



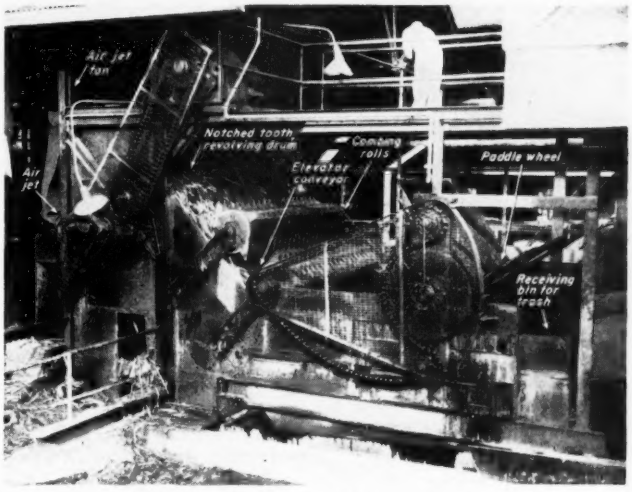
Walls, partitions, parking lots and other "bump-spots," can be protected with use of a Flex-Beam guardrail.

Already in wide use to promote highway safety, the guardrail can be employed both inside and outside a plant, wherever there is danger of tow-trucks, cars, or other moving units, striking walls and stationary equipment.

Guardrail is of beam type, deeply corrugated for strength. It is fabricated from semi-spring quality steel and punched for mounting on 12 ft.-6 in. centers. Splicing is by seven heat-treated high-carbon bolts. A water-proof, rust-inhibiting paint primer is applied after fabrication.—*Armco Drainage & Metal Products, Inc., Middletown, Ohio.*

Circle 119B on Reader Service Card

Air-Jet Unit Ups Cane Cleaning Efficiency



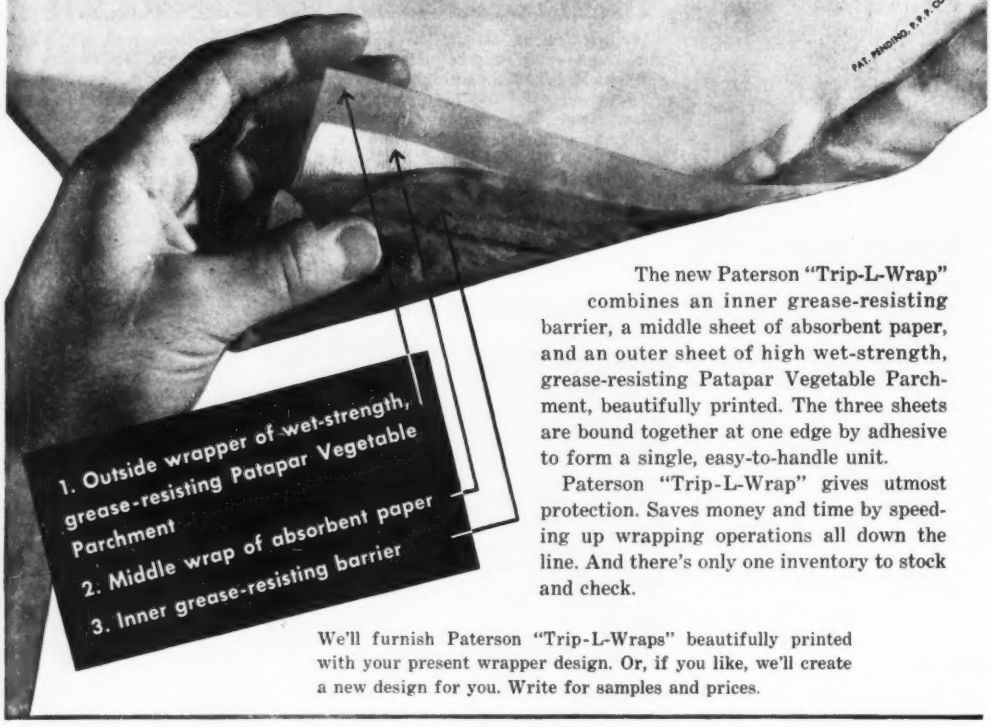
Short pieces of sugar cane, formerly lost in cleaning operations, are now recovered at the rate of 92 lb. per min. by a new machine in use at Kohala Sugar Co., Hawaii. New unit employs air jets to separate cane from leaf debris.

Under present methods of production, cane harvested mechanically comes to mills mixed with leaf trash.

New easy way to wrap **HAMS** *and* **BACON**

Paterson
"TRIP-L-WRAP"

complete sets of smoked meat wrappers


PAT. PENDING, P.P.P.CO.,S.P.
1. Outside wrapper of wet-strength, grease-resisting Patapar Vegetable Parchment
2. Middle wrap of absorbent paper
3. Inner grease-resisting barrier

The new Paterson "Trip-L-Wrap" combines an inner grease-resisting barrier, a middle sheet of absorbent paper, and an outer sheet of high wet-strength, grease-resisting Patapar Vegetable Parchment, beautifully printed. The three sheets are bound together at one edge by adhesive to form a single, easy-to-handle unit.

Paterson "Trip-L-Wrap" gives utmost protection. Saves money and time by speeding up wrapping operations all down the line. And there's only one inventory to stock and check.

We'll furnish Paterson "Trip-L-Wraps" beautifully printed with your present wrapper design. Or, if you like, we'll create a new design for you. Write for samples and prices.

PATERSON PARCHMENT PAPER COMPANY

BRISTOL, PENNSYLVANIA

Headquarters for Genuine Vegetable Parchment Since 1885

WEST COAST PLANT: 340 Bryant Street, San Francisco 7, California

SALES OFFICES: 111 West Washington Street, Chicago 2, Illinois • 122 East 42nd Street, New York 17, New York

rock and dirt from the fields. Cleaning plants were developed to recover the soil, vital to the fields, and also to strip the cane of leaves and other trash prior to milling.

In the last step of the conventional cleaning process, washed cane passes over two banks of Olsen rolls. These are revolving drums covered with flat discs having four-cornered points slanted at 45 deg. to the drum. These points entangle the trash and pull it down through the rolls. The big cane stalks pass over them. However, large quantities of short cane pieces are also pulled through the rolls along with the trash. Formerly, this short cane was lost.

In the new process this trash, together with short pieces of cane, is flumed directly to the salvager and dumped into a bin from which it is moved into the machine by a large four-paddle wheel. Paddles distribute the trash mixture evenly onto a feed conveyor elevated at a 45-deg. angle. Fingers on elevator carry the trash up and past two sets of combing rolls which straighten it out lengthwise. At top of elevator trash discharges onto a notched-tooth revolving drum.

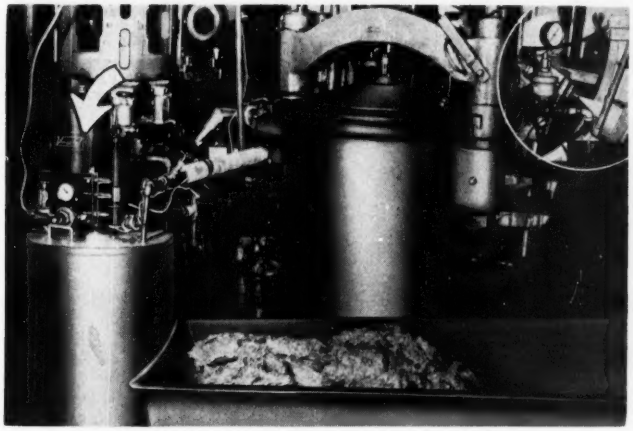
Here teeth impale the trash and carry it over the drum. Then as it begins to fall, it encounters two high-speed air jets. Force of air carries—lighter falling trash into a flume to one side. Heavier cane falls straight down onto a conveyor which delivers it to the clean cane carrier feeding the regular milling process.

This air separation principle was originally intended for use in portable dry cleaning machines designed to clean cane in fields rather than at the mill. These machines have never been perfected, however, and the mill cleaning method is still in use.

The machine is based on a design by E. R. Boles, Agricultural Engineer. —*Hawaiian Sugar Planters Association Experiment Station, 1527 Keeawumoku St., Honolulu. Hawaii.*

Circle 119C on Reader Service Card

Air Motor-Driven Pump Moves Liquids From Drums



Light liquids (fruit juices), heavy syrups, and semi-solids (shortenings and jellies) are reported efficiently transferred from original drum to desired point in processing line by this new air motor-driven pump.

Known as the "Tornado", it is available with two sizes of air motors —4¼ in. and 6 in. Pump capacities range from 2 to 20 gpm., depending upon material characteristics and operating pressures.

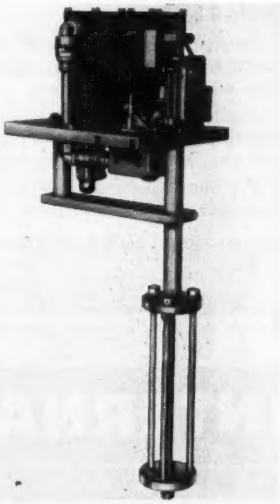
New motor has oversize outlet ports. Exhaust valves, pilot operated and timed with stroke of piston, instantly explode exhaust air to atmosphere. Thus, piston has free return action with no high compression to work against.

Air piston is synthetic rubber, self-adjusting, and needs no oiling. Air cylinder is made of high test furnace iron and has a chrome plated bore. Pump and air motor are separated. For handling of food items, pump piston and tube assembly is available in stainless steel.

Air consumption (cfm.) depends on pressure ratio, type of material, and delivery (gpm.) required. Pumps develop material pressure 2, 4, 5½, 8, 11, and 22 times that of air.

In our photograph, unit is shown employed in a meat plant for automatic spraying of vegetable oils into cans before they are packed. Closeup of spray nozzle is seen in circle.—*Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago 14.*

Circle 121A on Reader Service Card



New Element Handles Difficult Solutions

With use of a recently developed measuring element, solutions that normally build up an interfering coating can now be handled.

New model is particularly suitable for process control applications where these solutions tend to solidify when exposed to air.

This element is mounted vertically with the liquid level passing through the rod structure. A normal coating on rod at surface of liquid will not interfere with operation of instrument and this deposit buildup can be easily removed when necessary because of open construction.

Principle of operation is as follows: A piston on lower end of center rod operates in a cylinder, and a motor cam mechanism at top of rod raises assembly drawing a sample of solution into space within cylinder below piston. Assembly is then released and time required for it to drop and expel test sample is a measure of viscosity.—*Norcross Corp., Newton 58, Mass.*

Circle 121B on Reader Service Card

Food for thought!

Here's why International Trucks fit perfectly into the food picture.

Internationals are specialized to the job. They're engineered to operate at peak efficiency years longer than other trucks.

Add handling ease, real cab comfort, and the consistently economical operation you get—and you can see why food men depend on International.

For the truck to do your job better, see your International Dealer or Branch *now!*

INTERNATIONAL HARVESTER COMPANY · CHICAGO

Look for these International Truck exclusives:

- Silver Diamond valve-in-head engines are rugged, packed with extra power. Engineered to save you plenty on operating and maintenance costs.
- The roomiest, most comfortable cab on the road — the Comfo-Vision Cab. One-piece Sweepsight windshield. New green-tinted, non-glare safety glass available.
- Super-steering system—more positive control. Wider front axles make possible full 37° turning angle for easier handling and maneuverability.
- Wide variety of light-duty models—½, ¾, and 1-ton sizes—GVW's from 4,200 to 8,600 lbs. 115, 127, and 134-in. wheelbases. Pickup, panel, stake and many other types of bodies.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

SEE YOUR IH DEALER

Better roads mean a better America

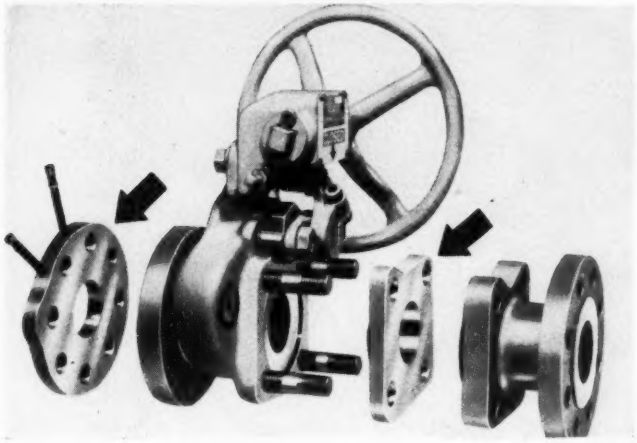
INTERNATIONAL TRUCKS

INTERNATIONAL

"Standard of the Highway"

International L-120 series available in GVW ratings from 5,400 to 6,500 lbs. 115 and 127-inch wheelbases.

Electrical Elements Heat Valve Parts, Products



In the handling of cold fluids, moving parts of this electrically heated valve are kept free from frost, and with viscous materials, products are kept warm.

Unit was designed to keep valve mechanisms clear of frost and ice in liquid carbon dioxide lines at temperatures as low as −110 deg. F.

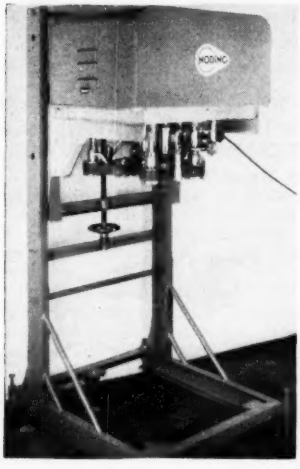
Single-disk valves require the heating elements seen at right in illustration. Double-disk valves can be equipped with both elements illustrated. Heat from elements is transmitted directly to valve seats, and as a result, entire flow opening through the valve is warmed, in addition to the operating mechanism.

Heated valves in sizes from 2- to 6-in. are available, with pneumatic, hydraulic, solenoid, or manual control. Heating elements can be provided for either 110 or 220v. operation, with inputs ranging from 400 to 3,000w. per unit.

Where flanged type valves are now in service, heating elements may be installed by simply exchanging standard studs for studs that are 1 in. longer. Delivery time: Approximately 60 days.—*Okadee Co., 332 S. Michigan Ave., Chicago 4*

Circle 123A on Reader Service Card

Automatic Cap Tightener Is Portable, Adjustable



This portable, automatic cap tightener is easily adjustable to conveyor, and container heights, diameter and cap size. No change parts or chucks are required.

Caps are applied and started by hand. Containers are placed on conveyor and carried through machine. No timing is required. Adjustable lateral belts hug containers as they pass through tightener. One pair of tightening disks seat the caps. All caps are uniformly tight. The lateral belts can be synchronized to lineal speed of conveyor employed.

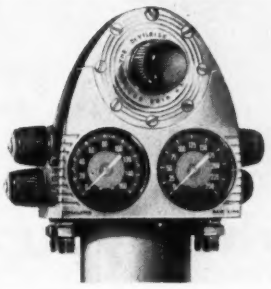
Ranges of adjustability are as follows: Container sizes, 1 oz. to 1 gal.; cap sizes, 8 to 120 mm.; conveyor height, 25 to 47 in.

Unit will handle glass, tin and plastic containers of any shape. Caps can be metal, plastic, screw or lug—any shape. Overall dimensions of machine are: Length 30 in.; depth 35 in.; frame height 65 in.

Mounted on casters with leveling screws, machine is powered by a ½ hp. motor, single or three phase. Capper is made by Noring Machine Corp. Sole agent is—*Eastern Packaging Equipment Co., 29-15 Bridge Plaza North, Long Island City 1, N. Y.*

Circle 123B on Reader Service Card

Air Transformer Operates Easily



This newly introduced air transformer, is reported easy to operate and sturdily built.

Transformer has a built-in two-stage regulating principle which provides for easier adjustment of pressures, requiring only finger tip control of adjusting knob. The knob actuates a small pilot regulator which in turn operates the diaphragm of the large regulator, thus giving ease of operation. The two-stage regulator also provides for closeness of pressure regulation and low pressure loss.

Oil and moisture, present in compressed air lines, is eliminated by transformer which traps liquids and delivers clean air to outlets.

Unit has a capacity of 100 cfm. Oil and moisture captured in condenser tube is easily drained by a pull-push drain knob. Pulling knob down closes drain, pushing up opens it.

Corrosion resisting metals have been used in all parts of condenser chamber which come directly in contact with compressed air. Head of transformer housing the regulator, two pressure gages and valves, is a zinc die casting. Gaskets at top and bottom of condenser chamber prevent leakage. Separating mechanism is a mechanical disc type filter. Diaphragm is made of soft rubber composition with a single fabric insert.—*De Vilbiss Co., Toledo.*

Circle 123C on Reader Service Card

when you specify light wall schedule 5 pipe

WHAT SCHEDULE 5 PIPE IS—
A light wall pipe, Carpenter Schedule 5 gives you more feet of pipe for every pound of scarce stainless steel. So you can quickly see how Schedule 5 reduces your cost per foot. Plus the fact that the larger I.D. means increased flow area.

HOW SCHEDULE 5 REDUCES COSTS
First saving is 40% to 50% on the cost of your pipe.

Since Schedule 5 is considerably lighter, this means quicker and easier installation.

And, because the increased capacity of Schedule 5 lets you use the next smaller pipe size, you can reduce substantially your costs of valves, fittings, etc.

FITTINGS ARE AVAILABLE
This pipe is easily adapted to use with existing lines of tubing or Schedule 40 and 10 pipe, using simple connectors. Fittings as well as stocks of Schedule 5 pipe are carried by conveniently located Carpenter distributors.

ADDITIONAL ADVANTAGES

Tubing sizes can now be replaced with light wall *pipe* . . . for ready hook-up with standard valves, pumps and other equipment which is normally manufactured in pipe sizes.

Data Sheets give you complete information about Carpenter Schedule 5 Stainless Pipe. Write for your personal copy. THE CARPENTER STEEL COMPANY, Alloy Tube Division, Union, N. J.
Export Dept.: The Carpenter Steel Co., Port Washington, N.Y. "CARSTEELCO"

Carpenter

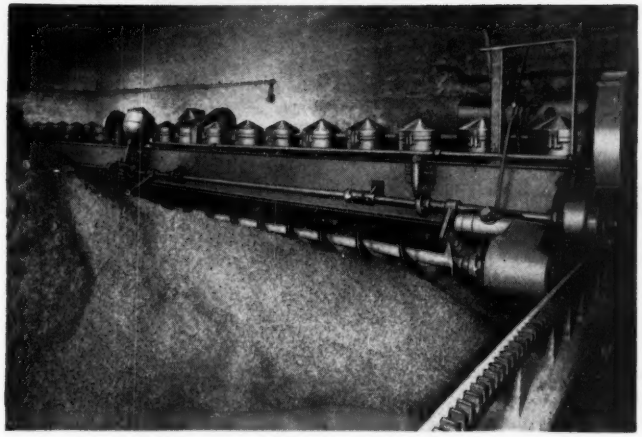
THE U.S. NEEDS YOUR STEEL SCRAP NOW

STAINLESS TUBING & PIPE

Analysis · Tolerance · Finish

- guaranteed on every shipment

Spiral Unit Spreads Malt Uniformly



Two benefits are claimed for this new spiral malt leveler. They are: (1) Uniformity in drying because unit spreads malt to an even depth throughout kiln, and (2) elimination of manual labor formerly required to level green malt in drying kiln.

A simple, right- and left-hand revolving spiral, unit attaches to malt turning machines in upper kilns. It spreads and levels the fresh heaps of green malt for uniform drying. Only one traverse of leveler through heaps of malt is required. After that, spiral is lifted out of way mechanically and turning machine continues its repeated journeys through freshly germinated malt.

Spiral leveler, maker states, can be attached to malt turning machines now in use.—*Galland-Henning Mfg. Co., Milwaukee 46, Wis.*

Circle 125A on Reader Service Card

Heat Sealer Provides Air Pocket-Free Bond

An intimate bond without air pockets is reported providing delay-action heat seal labels via use of this new hand unit.

Best way to apply this type label, company points out, is to roll activated label on with a squeegee action. New unit applies this method. Further, label is applied immediately after it is activated, while heat is still retained.

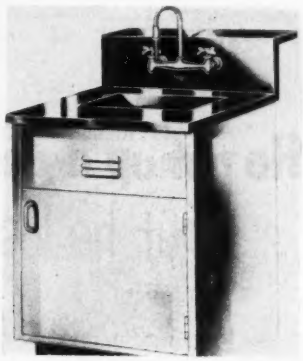
In operation, a label is fed into a slot at top of unit and passed between two temperature-balanced heating elements for activation and then rolled into position.

Activation and application is accomplished in one operation with very light pressure. Heating surfaces never touch product or package which makes it possible to label difficult films without distortion, company states. It is also reported that meat packages wrapped in cellophane can be successfully labeled without searing the meat and, because no pressure is exerted between the label and heating elements, no label smearing takes place.

Labeler is available in three sizes: The D-2, D-4, and D-6, for labels under 2, 4, and 6 in. wide, respectively. Also available is fixture for labeling cylindrical articles such as bottles, cans, tubes. This fixture holds the labeler in a fixed position and is equipped with suitable support rollers to permit quick application of the label.—*The Lakso Co., Inc., P. O. Box 257, Fitchburg, Mass.*

Circle 125B on Reader Service Card

Steel Sink Permits Working Flexibility



A steel sink unit designed for working flexibility in the laboratory has just been introduced.

This sink has a special heavy-duty laboratory double faucet of solid brass, triple plated with copper, nickel and chrome. The trap, overflow, and outlet plug are Tellurium lead. Basin, made of 1¼ in. Chemstone with bottom grooved to receive sides, is 16 in. long, 16 in. wide, 9 in. deep. It features a leak-proof tongue and groove and cement bonded construction.

Trap outlet is 1½ in. ID. and extends through rear panel of unit.—*Emil Greiner Co., 20-26 N. Moore St., New York City.*

Circle 125C on Reader Service Card

Filter Spray-Jets Quickly Cleaned

Faster and easier cleaning of the spray jets in a self-cleaning filter is accomplished by making them part of removable strainer assembly.

In this type filter, jet sprays inside tank are used to lance media and sludge from outer surfaces of leaves and flush materials into drain at bottom of tank. Water for these jets

He put up a good fight but he lost!

That once familiar sight, the cigar-store Indian with his tomahawk and other accessories, is an all but vanished American. And gone with him are the awkward, inadequate tobacco containers of his day.

Today, tobacco is packed in special tins that are designed to keep moisture and dirt out . . . and the flavor and aroma in! It's a can that keeps tobacco fresher . . . longer!

The modern tobacco can, ideally shaped for convenience and protection, is another example of Canco's ability to design and produce *superior containers* for *special products!*

Canco, combining versatility and a background of over half a century in the packaging field, will continue to pioneer improvements for its customers.

AMERICAN CAN CO.

CANCO

NEW YORK
CHICAGO
SAN FRANCISCO
HAMILTON, CANADA

CONTAINERS—to help people live better

is fed through a header at top of filter, the spray jets being placed in the header at proper intervals.

In the past, when pipe scale or other foreign matter in wash water clogged one or more of these spray jets, it was necessary to open tank, slide out filter leaves and crawl into tank to get at heads, remove, and clean them.

In new method, removable assembly is inserted from outside of header and passes through it. Now, when a spray jet becomes clogged it is merely necessary to unscrew assembly from outside of tank, clean nozzle and replace it.

In plant operation, it will now be possible to check spray jets by an easy routine inspection that was formerly a long and arduous job.—*Hercules Filter Corp., Paterson, New Jersey.*

Circle 125D on Reader Service Card

Non-Melting Refrigerant Can Be Re-Used

This new refrigerant in the form of a colloidal gel outlasts ordinary ice three to five times and retains its original shape without water run-off.

Known as "Sno-Gel", the product's temperature can be regulated by change of formula. It is commercially available at freezing points between −8 and +30 deg. F. This flexibility enables it to refrigerate products at temperatures required without freezing them.

Material is non-toxic compound in form of white powder. When mixed with water, it becomes a jelly-like substance which, when frozen, produces a more constant rate of heat absorption than does ice. As it starts to unfreeze, the outside temperature rises first while surface structure stays the same. Its refrigerating quality expended, approximate original size is retained, thus eliminating void spaces in the container and preventing loosening and shifting of merchandise in transit. Material remains dormant under mechanical refrigeration and is ready to act as refrigerant when product hits the dock and is without other cooling agents.

Product is available in variety of colors and packages, colors indicating temperature at which the particular package is to be frozen. It is made up in uncovered blocks, slabs, tubes, as "crushed ice", in heavy wear-resistant bags and in polyethylene bags.

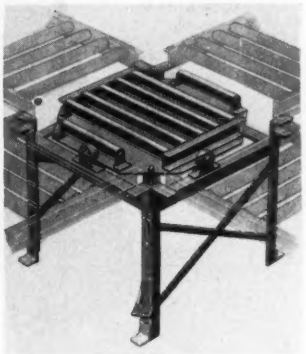
Shippers with their own freezing facilities can buy it unfrozen and freeze it as needed, or it can be frozen at local cold storage warehouses. For the small shipper with his own ice or flaking machines, the product comes as a "Magic Ice Powder" which, mixed with ordinary ice, becomes non-flowing ice.

Besides being used for refrigerating shipments of perishables by train, truck and other forms of transportation, material has been made in tube form, packed in polyethylene, and designed to fit into a fibreboard display unit in retail stores. Grocers can freeze the tubes overnight and place them in display units to keep foods cold during the day. Company also puts out package of tubes designed for use by picnickers, campers and sportsmen (above).

Cost of refrigerant is competitive with wet or dry ice, depending on the eutectic point desired and whether it is used more than once. Used once and discarded, its cost is mid-way between wet and dry ice; reused several times, it is reported less expensive than wet ice.—*Chemical & Fibre Associates, Inc., 334 Magnolia, Oakland, Calif.*

Circle 127A on Reader Service Card

Roller Turntable Ups System's Versatility



Added versatility is provided by incorporating turntable into roller gravity conveyor system.

Unit can be locked in position so that flow of packages is in one direction only. Otherwise, it makes possible a change in direction of packages, cases, or cartons that are being processed during production or shipping.

Ruggedly built, it consists of a roller section and two auxiliary rolls. Swivel section relvolves on casters on a center point. A simple foot treadle is provided to lock table into position. It is particularly designed for lighter loads since a man must revolve the load.—*Lamson Corp., Syracuse, N. Y.*

Circle 127B on Reader Service Card

Brake Motor Provides Immediate Stops

For use with variable speed transmission units in sizes from ¼ to 3 hp. is a new type of brake motor.

Built-in unit provides for immediate stops required in indexing and positioning work. This feature, plus wide speed range with exact holding and ability to reset at a given speed, make unit particularly well suited for applications requiring accuracy. These applications include metering and proportioning work and jobs where speed of one part of a materials handling

Prominent Pickle Packers* Pick

...MAGNA SPICE CONCENTROLS†

THE MM&R BRAND OF BLENDED SPICE SEASONINGS

***DETAILS ON REQUEST**

†T. M. REG. APPLIED FOR

PICKLE PACKERS, like food processors of all kinds, pick MAGNA SPICE CONCENTROLS for controlled seasoning and uniform flavor in every batch — at no extra cost.

So, if you're "in a pickle" call on MM&R. The MAGNA man will gladly work with you to make yours a better product. Write today.

Magnus, Mabee & Reynard, inc.

Since 1895 **ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS**

16 Desbresses Street, New York 13, N. Y. · 221 North La Salle Street, Chicago 1, Illinois

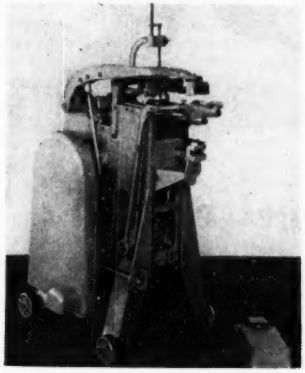
system must be synchronized with another.

New brake is a direct acting disk type having few parts, and no solenoid or mechanical linkages. Motor and brake are connected in parallel. Starting motor simultaneously energizes magnet coils. Magnet attracts armatures which are attached to pressure plate, compressing springs, and releasing disks.

Stopping motor de-energizes coils. Spring tension then forces plate back, applying pressure to disks, quickly stopping and holding load.—*Graham Transmissions Inc., 3754 North Holton St., Milwaukee 12, Wis.*

Circle 127C on Reader Service Card

Easy Operation Marks Compact Labeler



Simplicity of design, sturdiness, and ease of operation are claimed for a new compact, versatile labeling machine.

Known as the "World" Model B Semi-Automatic Labeler, it features precision registration of labels, from postage stamp size up to as large as 4½ by 6, at speeds up to 60 containers per minute. It is equipped with variable speed control.

A multiple cam supplies the motion for all moving parts. Simple attachments permit rapid changeover to various sizes of labels and containers.

Operator feeds container to unit and presses electric control foot treadle. Labels are automatically picked up by an adhesive coated picker and transferred to container by vacuum. A pressure wiper fastens label firmly to container. Then it is ready for removal and replacement by the operator.—*Economic Machinery Co., Div. of Geo. J. Meyer Mfg. Co., Worcester, Mass.*

Circle 129A on Reader Service Card

Gun Injects Lubricants At High Pressures

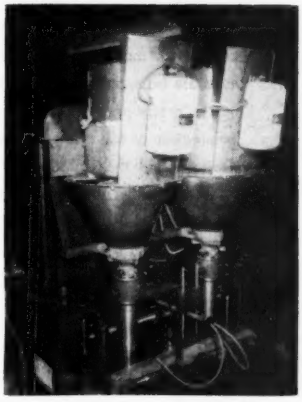
Bearings on industrial machinery requiring injection of small quantity of lubricant at extremely high pressure can be serviced by this new gun, Model 1120.

Gun provides range of pressures up to 10,000 psi. It has easy one-hand push action and weighs only 2 lb. Long, hydraulic coupler extension permits servicing deep-seated and hard-to-reach fittings.

Gun holds 2½ oz. It can be refilled in seconds by engaging filler fitting on gun with control valve on hose from power, or manually operated, pump. Gun can be cleaned by removing one outlet check with no packings to replace.—*Lincoln Engineering Co., 5781 Natural Bridge Ave., St. Louis 20, Mo.*

Circle 129B on Reader Service Card

Automatic Auger Feed Is Highly Accurate



Close control of the product in packaging is claimed with use of a new automatic auger feed.

This feed has an electric clutch brake mechanism to give high accuracy. Auger is available as an individual unit for many types of semi-automatic packaging setups, as well as all Transwrap machines. Another feature, not available before, is the individual adjustment of each side of the double feed by a simple dial arrangement.

This feeder has a capacity up to 80 cu. in. when adapted to the maker's Model B machine. Electric clutch brake mechanism is built for long life.

Unit can also be converted into a pump to feed a liquid as fluid as water or as viscous as grease.—*Transparent Wrap Machine Corp., Route 17 & Henry St., Hasbrouk Heights, N. J.*

Circle 129C on Reader Service Card

New Model Fork Truck Is Light, Compact

Low floor loadings and little required operating space are advantages claimed for new, Model J, fork truck.

Weight of machine, with batteries, has been lowered to 3,200 lb. in the 1,000 lb. capacity truck; 3,500 lb. in the 1,500; and 3,900 in the 2,000. Saving in weight effects reduced floor loadings.

Aisle requirements are 5 ft. plus load length. Rear drive wheel can be rotated 90 deg. to front wheels, permitting truck to be turned in minimum of space.

Other features of unit are: GE. compound-wound traction motor; double-reduction, high-precision gear drive; time acceleration and anti-plug interlock. All components of unit are readily accessible.—*Lewis-Shepard Products, Dept. R-1, Watertown, Mass.*

Circle 129D on Reader Service Card

GREASY PRODUCTS ARE NO PROBLEM

. . . with tailor-made Riegel papers

A few things RIEGEL can do for you . . .

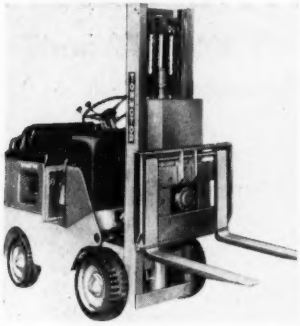
- Keep products dry
- Keep products moist
- Retard rancidity
- Seal with heat or glue
- Provide wet strength
- Stop grease penetration
- Retain aromas, flavors
- Resist extreme cold
- Reduce breakage
- Prevent sifting
- Protect from light
- Resist alkalis
- Resist corrosion
- Boost machine efficiency

FATS, GREASES AND OILS which bleed through ordinary papers often spoil appearance, affect delicate flavors and aromas, and sometimes even destroy other protective properties of the package. Riegel has solved these problems for many products such as potato chips, chocolate bars, soap and meats. Whether the solution is a simple greaseproof glassine or a heat-seal triplex lamination of foil and glassine, Riegel can usually tailor-make the right paper . . . quickly, efficiently, economically. Write to *Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.*

Riegel FUNCTIONAL PAPERS FOR PROTECTIVE PACKAGING

▸ WRITE FOR SAMPLE BOOK

Turning Forks Speed Lift-Truck Transfers



Dependable handling of loads for container-to-container transfer is furthered by new fork-truck accessory—a revolving carriage. With use of unit, container mounted on forks can be turned 180 deg. for complete dumping in five seconds.

Rotation of heavy loads through a full 360 deg. in either direction is provided by hydraulic motor, coupled to spindle of the revolving carriage by a chain drive. Positive, finger-tip control over speed and direction of rotation is provided through a hydraulic valve, conveniently located within easy reach of the operator.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio.*

Circle 131A on Reader Service Card

New Chemicals

Mildew-Resisting Enamel Uses Non-Toxic Fungicide

Now in trial-marketing stage is a new mildew-resisting enamel containing a non-toxic fungicide for use in food processing areas.

Tests in creameries, meat packing plants, branch houses, and poultry plants show this formulation to be highly effective. Panels exposed over 18 months, maker reports, are still mildew-free in rooms that are normally covered with profuse mold growth within two months.

Published reports of successful experimetal use of this finish emphasize that its cost is negligible compared to present cleaning and scrubbing requirements in maintaining sanitary conditions in interiors where fungus contamination is a serious hazard.

"Cunilate" fungicide, or copper-8-quinolinolate, is manufactured by the Scientific Oil Compounding Co., Chicago.

Technical personnel who successfully formulated the enamel say that in order to achieve a satisfactorily balanced finish it is necessary to incorporate fungicide in the course of manufacture. Adding fungicide to completed product impairs its consistency. Also some pigments react with fungicides.

Although technically being introduced on a trial basis, maker feels sufficient test experience is behind new enamel to warrant start of production.—*E. I. du Pont de Nemours & Co., Wilmington, Delaware.*

Circle 131B on Reader Service Card

Hair Net Visor Offers Two-Way Protection

Easy and complete coverage of the hair is provided by this GS No. 41 hair net visor. In food plants, their use protects both the worker and the product.

Nets, cool to wear, and termed negligible in weight are available in five colors: White, black, red, green and maize. Made in one size only, they are adjustable to all head sizes which simplifies ordering and stocking.

Green opaque visor eliminates glare from overhead lighting and reflection from shiny metals, thus relieving eye strain.—*General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 2.*

Circle 131C on Reader Service Card

Dual-Purpose Lubricant For "Stand-by" Periods

An internal combustion engine which is temporarily taken out of service can now be protected with a recently developed dual-purpose lubricant.

Produced in two grades, 10, and 30, the new oil functions as both a lubricant and a preservative. It eliminates need for handling two products successively.

Preceding or following the stand-by period, an engine must be properly lubricated for service and it must be protected against rust and the acidic products of combustion while not being used. In the past it has been necessary to accommodate these needs with separate products. The lubricant was drained from the engine and a preservative put in, and vice versa, depending upon whether the engine was going in or out of service.

New oil is reported to combine special additives to ensure preservation of internal engine surfaces with motor oil additives of type used in heavy duty lubricants.

When functioning as a lubricant, it need not be changed until engine has reached normal drain-and-refill point.—*The Texas Co., 135 East 42nd St., New York City.*

Circle 131D on Reader Service Card

New Resin-Base Adhesive Minimizes Flash Hazard

A resin base adhesive is now reported having an increased margin of safety against both flash and fire.

Adhesive properties, attained through the intermolecular rearrangement of the resin structure, are stated equal to that of conventional resin base products.

In use, fairly high temperatures are employed. These are, in deg. F: For the can 40-115, 50-130, 55-150, 105-185; for the adhesive 220-240, 230-260, 240-270, and 260-280, respectively.—*Lyons Laboratories Inc., Foot of Harrison Ave., Matawan, N. J.*

Circle 131E on Reader Service Card

Non-Toxic Insecticide Does Quick Job

Developed for the eradication of roaches, flies, and varied insects in food plants, a new insecticide, called Diverside, is described as a unique combination of pyrethrum and new insecticidal chemicals.

It is claimed to have excellent kill-power, speed, and completeness of action. It is termed nontoxic, odorless, and safe to use.—*The Diversey Corp., 1820 Roscoe St., Chicago 13.*

Circle 131F on Reader Service Card

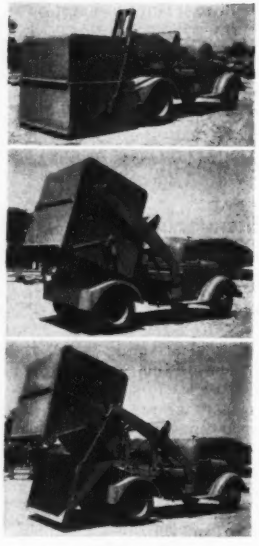
One DEMPSTER-DUMPSTER Serves Scores of Containers . . All Designs . . . All Sizes . .

Handling Materials of Almost Every Description at the Lowest Possible Cost!

One Dempster-Dumpster mounted on one of your trucks serves any required number of big detachable Dempster-Dumpster Containers spotted at convenient materials accumulation points inside and outside your buildings. The capacity of these containers range up to four times greater than the average dump truck body. They are built in a wide variety of designs best suited to the materials handled—be they solid, liquid or dust . . . trash or rubbish . . . bulky light or heavy. The truck-mounted Dempster-Dumpster, with only one man, the driver, picks up one pre-loaded container after another, hauls it to destination where materials are dumped or load set down intact. The Dempster-Dumpster may handle raw materials on one haul, liquids on another, trash and rubbish on another, etc. It's like having one truck with 15, 25, 65 or 100 different bodies.

This is the *Dempster-Dumpster System*—the modern method of bulk materials handling. It is saving thousands of dollars annually for hundreds of plants in every type of industry because it: Eliminates 3 to 5 conventional trucks and crews—reducing cost of truck equipment and operation accordingly. . . Eliminates standing idle time of trucks and crews. . . Eliminates re-handling of materials. . . Increases efficiency, sanitation and good housekeeping.

The *Dempster-Dumpster System* is, without question, the most efficient method of materials handling by truck ever devised! More efficient and lower cost materials handling in your plant may be simply a matter of getting the minds of your engineers and ours together. Write us now. The *Dempster-Dumpster System* is manufactured exclusively by Dempster Brothers, Inc.



WHEN A CONTAINER is full, the Dempster-Dumpster picks it up, hauls it to destination and dumps the materials or sets the load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

DEMPSTER BROTHERS, 7102 Shea Building, Knoxville 17, Tenn.

In Behalf of Progress . . .

Time To Quit Toying With Innovations

Too many food companies have been doing too many things the same way too long. And many men in executive positions in the industry have no real appreciation of the cost-cutting, quality-improving opportunities that lie under their very noses every time they walk through their plants.

We don't advocate change for the sake of change. But engineering and technical progress in industry as a whole has set a fast pace in recent years. And the food field has not kept up with the parade.

Even progressive management men too often take the wrong approach to improvement. Or they set their sights too low.

In years gone by, a majority of food processing improvements came through new knowledge of applied food science. Today it is different. The big pay dirt lies in a re-engineering of operations and processes. Food science, of course, necessarily is very much involved. But the approach—the visualization of the opportunity—is from the engineering viewpoint.

Continuous short-high aseptic canning is an engineering achievement. So is quick curing of bacon by injecting pickle into the belly. So also are other equally revolutionary processes now in the pilot-plant stage.

When we say that management men set their progress sights too low, we mean this: They too often are satisfied with a relatively minor improvement in a traditional process or operation—when a radical change is feasible.

If no change has been made in an operation in 10 years, it is safe to say that someone is missing a bet. If there has been no significant alteration in 20 years, several people have been asleep. And if the job is being done the age-old way, management is guilty of gross negligence or incompetence.

And another thing: It is not enough for executives to be open-minded to suggestions from engineers and technologists.

They should take the initiative in demanding progress—in setting goals that call for real innovations, not minor alterations.

Want To Win an "Oscar"?

Recognition for outstanding achievement is food for the souls of those who strive for progress. It not only makes the creative genius feel rewarded for his efforts, but it inspires him to further accomplishment.

Traditionally, the food processing industry has been a little slow with the "Oscars." This situation stems in large measure from inadequate appreciation of technical men and their works.

So we want to remind you that another FOOD ENGINEERING Award is coming up. It will be presented at the 1953 annual meeting of the Institute of Food Technologists, and the competition now is open for entries. January 1 is the deadline, but you can't develop a creditable presentation if you wait until the last minute.

Since this Award goes to a food processing company, it does more than give recognition to the technical people involved. It pays tribute to the far-sightedness of management in putting new technical know-how to work.

It therefore builds morale among all of the company's employees, for there is no man worth his salt who does not like to work for a leader.

Here is an opportunity for national recognition on the highest level. And if your company has developed —or been the first to adopt—a significant new or improved food process, tell the Editor of FOOD ENGINEERING about it. Then send along the kind of information mentioned on page 208 of August FE.

It seldom pays to hide your light under a bushel.

Fight for This Benefit

Control of stream pollution by food plant wastes is an expensive operation which often pays no financial dividends. Nevertheless it is an essential service to the community. And public pressure to reduce pollution—even of the air—is becoming steadily greater.

Communities are quick to condemn the processor whose waste kills fish in a stream, develops an odor nuisance, or spoils local bathing.

All alert food companies with sizable volumes of waste therefore should be exploring new and improved methods—such as spraying waste water on fields or forests. They should be investigating opportunities to convert waste to salable byproducts—like animal feed and fertilizer. And they ought to apply measures to reduce the volume of waste—as by economy in water usage.

But food processors should not stop with their own operations. They ought to get actively behind proposed legislation to allow a five-year write-off of the cost of new pollution-control installations. Such legislation would permit a larger-than-normal depreciation allowance to be substracted from taxable income.

After all, improved pollution control usually is a non-profit public service. So industry is entitled to the tax benefit.

You should apprise your Congressmen of the high-cost, non-revenue aspects of new anti-pollution installations. Once the nature and extent of the problem are realized, some measure of relief may be granted.

The Reader AUDITED PAID CIRCULATION ABC *His Mark*

THE ABC SYMBOL which is printed at the head of this page is, in a very real sense, *your* brand on this magazine. Those letters stand for Audit Bureau of Circulations. The symbol indicates that the magazine is a member and supporter of that Bureau.

To the advertiser who contemplates using the magazine as an advertising medium, this symbol has a well-recognized significance. It tells him that the circulation records and practices of the magazine are wide open to the auditors of the Bureau, who check the publisher's claims and make public the precise terms and conditions under which subscriptions are obtained. And it assures him that the magazine stays in business by virtue of a demonstrated demand from its readers as shown by their paid subscriptions or newsstand purchases.

BUT HERE we are concerned only with the significance of ABC to you as a reader. For when the advertisers, the advertising agencies, and the publishers founded the Bureau nearly forty years ago to help establish honest circulation figures, they unwittingly set up a cooperative institution that has become a major safeguard for the interests of the reading public.

That is because membership in ABC constitutes one of the strongest guarantees that any publication can offer of its primary devotion to the interests of its readers. And by making that guarantee possible, ABC becomes a major safeguard of the freedom of the press, an objective of exceptional importance in these days when the public is flooded with propaganda from so many sources.

THE SUREST MEANS by which to preserve a free press is to keep it directly answerable to the reading public it would serve. It follows, then, that the survival of a truly free press must depend on its acceptance by that public; and that means in turn that the people must have in their hands some adequate means for holding the publishers responsible to them.

No one has yet devised any means to that end more simple, more direct or more practical than the paid subscription or newsstand purchase price. The right to purchase or refrain from purchasing a publication gives to the readers and to no one else the power to pass judgment on whether that publication should continue to serve the reading public.

TO SUPERVISE this vital process, to check and certify the integrity of the publication's circulation methods and claims, requires a strict and continuing audit of each publication's success in meeting this test of its public acceptance. To that essential function the ABC has contributed mightily by the conscientious performance of its mission. And that is why we are able to have a press supported, for the most part, by advertising revenues, but not controlled as to its circulation or content by any influence other than its readers.

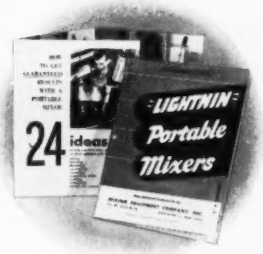
When an advertiser consults the ABC statement of a publication to ascertain the amount, the quality and the trend of its circulation, he does so in the legitimate pursuit of his own interest. But at the same time, inevitably, he is helping the ABC to keep the press responsible and responsive to the reading public. For, in effect, he is asking the publication to demonstrate through its circulation figures that it owes its standing to a voluntary demand by its readers.

SO THE Audit Bureau of Circulations, by auditing and certifying paid circulations, has come to perform a vital service to the readers of this magazine and of every other member publication. And in performing that service, it helps to maintain in our country a press that is answerable to the reading public and to it alone. So long as the practices and principles for which ABC stands continue to prevail in American publishing, we shall find in it a sure support for a truly free press, responsible only to the public it serves.

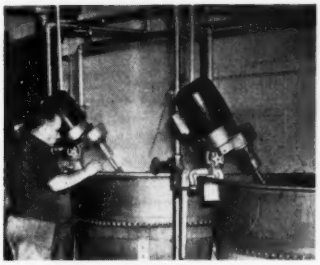
McGraw-Hill Publishing Company

Check the mixing jobs you can do with Lightnin® Mixers

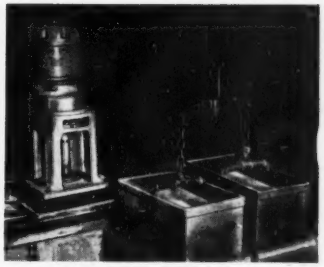
HOW TO GET BETTER MIXING RESULTS



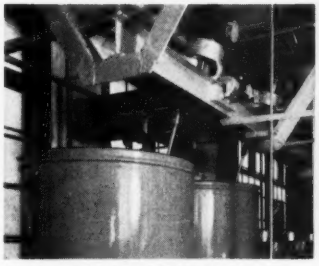
NEW "24 IDEAS" FOLDER gives 24 useful tips on portable mixers. Send for it today. Ask also for big 28-page Catalog B-75, illustrating and fully describing Lightnin Portable Mixers. Check the coupon now!



1. IF YOU WANT TO STIR your product while it cooks, use a Lightnin Mixer. Make any open container into a mixing vessel, at low cost, by adding a Lightnin Portable Mixer. There are 30 models to choose from. Results fully guaranteed!



2. GET BETTER YIELDS by letting Lightnin Mixer do odd jobs for you. Example: this Lightnin Mixer circulates brine in cold storage plant so efficiently that it gives the user 20% more ice, formerly lost through incomplete freezing.



3. TO SUSPEND SOLIDS, dissolve powders or crystals, or mix syrups quickly, you'll find nothing better than a Lightnin Mixer. These Lightnins mix 200-gallon batches of premix for mayonnaise for high uniformity.

4. GET BETTER UNIFORMITY of incoming tank loads, by pre-mixing the load in the tank before dumping. It takes only ⅓ HP Lightnin Mixer to turn over this 2,000-gallon milk load.

MIXCO

fluid agitation specialists

SERVING THE FOOD INDUSTRY FOR MORE THAN 30 YEARS

PORTABLE
⅛ to 3 HP

FOR
OPEN TANKS
¼ to 3 HP

FOR
CLOSED TANKS
¼ to 3 HP

MIXING EQUIPMENT Co., Inc.

143 Mt. Read Blvd., Rochester 11, N. Y.

In Canada: William & J. G. Greey, Ltd., Toronto

Please send me the literature checked:

- ☐ "24 IDEAS" Folder
- ☐ B-75 Portable mixers (electric and air driven)
- ☐ B-104 Side Entering Mixers
- ☐ DH-50 Laboratory Mixers
- ☐ B-103 Top Entering Mixers (propeller type)
- ☐ B-105 Condensed Catalog showing complete line
- ☐ B-102 Top Entering Mixers (turbine and paddle type)

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

TURN PAGE FOR FOLDOUT FLOWSHEET →

New "Sugar Service" Processing Line

It simply prepares liquid, blend, and corn syrup products for delivery in economically feasible bulk lots to growing food-plant market . . . Requires only three workers

HERE, is an innovation in bulk-sugar processing seen having broad potential—Amalgamated Sugar's new Portland, Ore., setup for meeting fast-expanding demands for less-than-carload deliveries.

The line is specially marked by high mechanization and instrumentation for operating efficiency and protection of product quality. And the small number of men needed to run it—only 3—reflects its advanced engineering.

Bulk granulated sugar is delivered to the plant in rail cars. A bucket elevator raises it to the top of the silo—Point (1) in the diagram—where a scroll conveyor distributes it through a series of ports into storage.

From the silo, sugar is chuted to the scale hopper (2), by actuation at control panel (seen in photo), in 100-lb. units in amounts as needed per batch. From this hopper, it passes through a twin-dump scale into a turret hopper having two discharge spouts leading to two 660-gal. steam-heated stainless steel kettles (3).

While the sugar is being fed to the kettles, a pre-set meter simultaneously delivers the correct amount of heated pure water. Temperatures in this operation are under control of instruments (seen in photo). Mixing proportions are ¼ water and ¾ sugar solids by weight.

In a 20-min. cycle, while under agitation, the ingredients are melted at 160 deg. F. into a sugar solution of 66.5 Brix.

Liquid sugar is moved by a positive displacement pump to a polishing filter (4) and then to a heat exchanger (5)

REASONING, PLANNING, AND ENGINEERING behind Amalgamated's new market-broadening bulk sweetener operation are detailed in our special feature article on page 71.

where its temperature is reduced to 86 deg. F. to inhibit inversion. From the cooler, it is pumped to one of the 16,000 gal. liquid storage tanks, or direct to shipping.

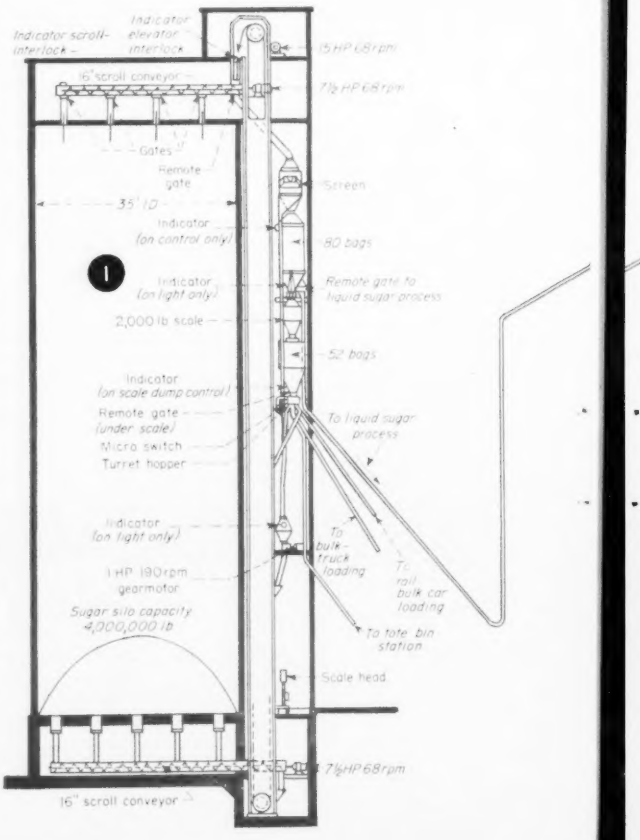
From storage, liquid sugar may be pumped back to the melters (to be blended with corn syrup), or to tank trucks. Germicidal lamps, installed inside the tanks, protect the product from mold or bacterial contamination.

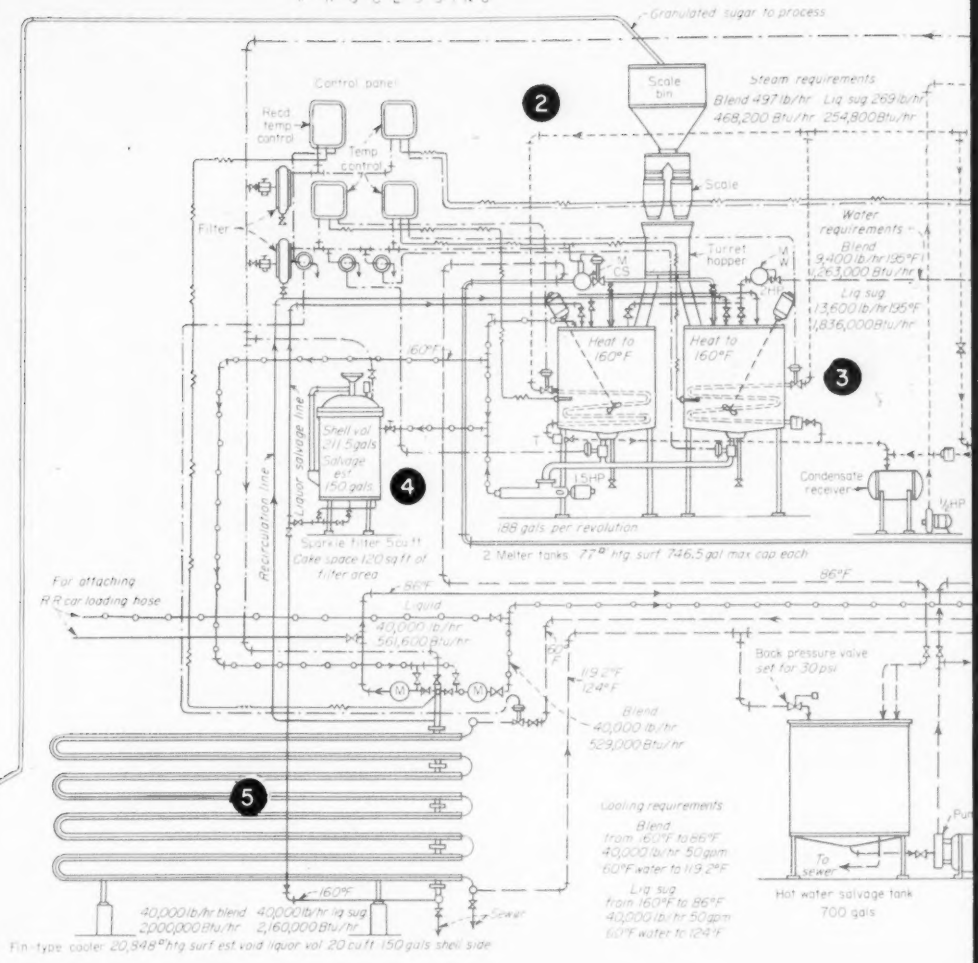
The process heat sequence, or simplified energy balance, in flowsheet is further evidence of this plant's efficiency

To start the operation, steam is first supplied to the pre-heater (which then provides hot water for making liquid sugar) and to the coils of the two melting kettles. Thereafter, city water, used in the heat exchanger, is returned to the pre-heater at 119 to 124 deg. F.

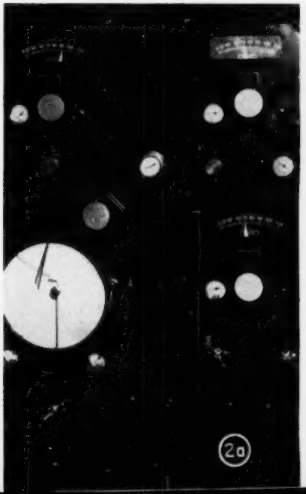
After the initial warm-up, very little steam is required by pre-heater, melting kettles, or to replenish radiation losses. All condensate is returned to receivers to be used as boiler-water supply.

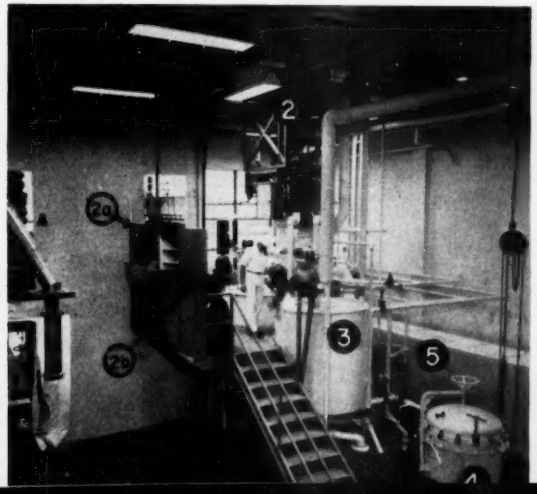
1 CAR OF SUGAR is spotted over receiving hopper. Contents then move to silo via conveyor and elevator.

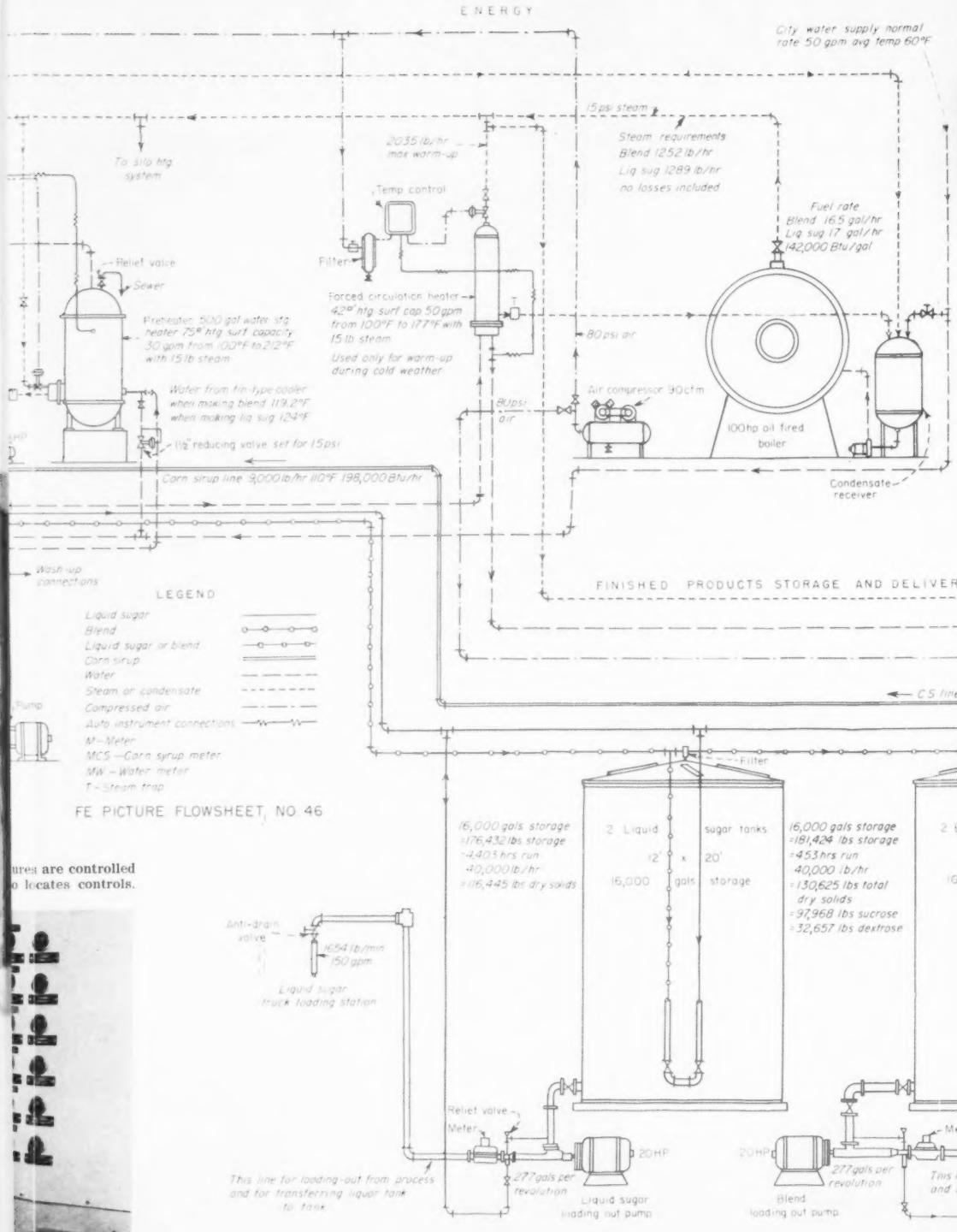



Granulated sugar to process
Control panel
Recd. temp. control
Temp. control
Filter
Scale bin
Scale
Steam requirements
Blend 497 lb/hr Liq sug 269 lb/hr
468,200 Btu/hr 254,800 Btu/hr
Water requirements
Blend 9,400 lb/hr 186°F
1,263,000 Btu/hr
Liq sug 3,600 lb/hr 186°F
1,836,000 Btu/hr
Turret hopper
Heat to 160°F
Heat to 160°F
Condensate receiver
188 gals. per revolution
2 Melter tanks 77 ft² htg. surf. 746.5 gal max. cap. each
160°F
Shell vol 211.5 gals
Salvage est 150 gals
Sparkle filter 5 sq ft
Cake space 120 sq ft of filter area
Liquor salvage line
Recirculation line
For attaching R.R. car loading hose
86°F
Liquid 40,000 lb/hr 561,600 Btu/hr
119.2°F
124°F
Blend 40,000 lb/hr 529,000 Btu/hr
Back pressure valve set for 30 psi
Cooling requirements
Blend from 160°F to 86°F 40,000 lb/hr 50 gpm 60°F water to 119.2°F
Liq sug from 160°F to 86°F 40,000 lb/hr 50 gpm 60°F water to 124°F
To sewer
Hot water salvage tank 700 gals
160°F
40,000 lb/hr blend 2,000,000 Btu/hr
40,000 lb/hr liq sug 2,160,000 Btu/hr
Sewer
Fin-type cooler 20,348 ft² htg surf est void liquor vol 20 cu ft 150 gals shell side

2-5 **FLOW of sugar solids is via hopper (2)—regulated from panel (right photo)—and on into melters (3). Process temperature by instruments (left photo). Liquid sugar goes to filter (4), and is cooled in enclosed heat exchanger (5). Center photo l**





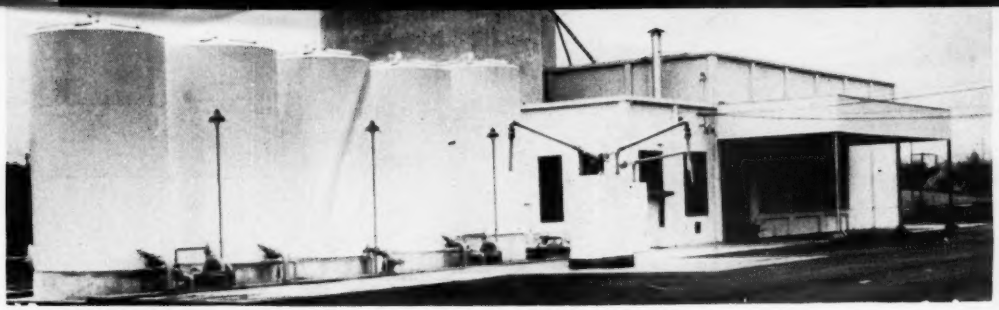


FE PICTURE FLOWSHEET, NO. 46

ures are controlled o locates controls.

6 IN T loade

Bin leve Control Convey Fabri Motors— Gener Scales— Weigh Screen, Tank; Winch, Truck,



6 **IN THESE TANKS,** liquid sugar and blended syrups are maintained under rigid sanitary conditions. Tank trucks are loaded via the counterweighted pipe spouts seen on island in center.

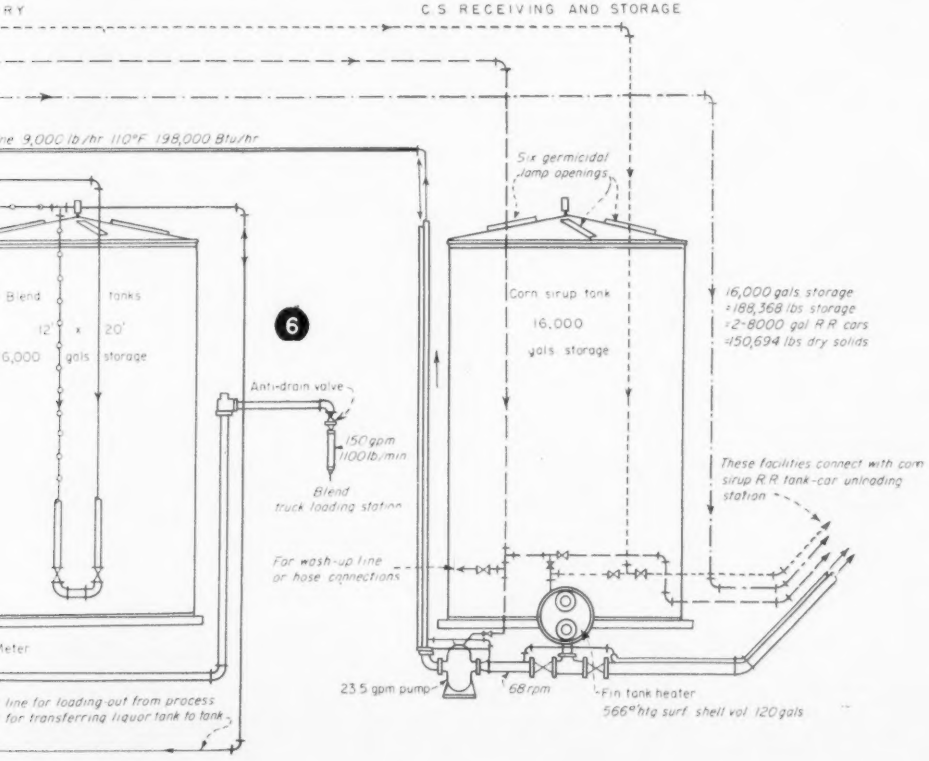
LIST OF EQUIPMENT

Solids Units

Bin level indicators—The Bin-Dicator Co.
Controls, automatic—General Electric Co.
Conveyors, scroll; Bucket elevator—Thompson Metal Fabricators
Motors—U. S. Electrical Motors, Inc.; Westinghouse General Electric
Scales—Merrifield Scale Co.; Detecto Scale Co.; Exact Weight Scale Co.
Screen, vibrating—W. S. Tyler Co.
Tank; Turret hopper—Thompson Metal Fabricators
Winch, railroad car puller—Link-Belt Co.
Truck, fork lift—Automatic Electric Truck Co.

Liquid Units

Agitators, "Lightnin"—Mixing Equipment Co.
Boiler—Gabriel Boilers
Compressor, air—Westinghouse Air Brake Co.
Controls, automatic—Taylor Instrument Co's.
Exchanger, heat; Preheater; Heater—The Sims Co.
Filter, "Sparkler"—Sparkler Mfg. Co.
Filter, "Staynew"—Dollinger Corp.
Heater, corn syrup—Griscom-Russell Co.
Meters—Neptune Meter Co.
Melters—Flake Metal Fabricators
Pump, "Moyno" positive displacement—Robbins & Myers
Pumps (other)—Blackmer Pump Co.; Worthington Corp.
Tanks—American Pipe & Construction Co.



NEW!

Another great development by Dodge that provides instant and positive protection for driven machines, motors and the famous Torque-Arm Speed Reducer.

The new Dodge Tri-Matic Overload release protects your machines mechanically and electrically. This positive acting release replaces the standard torque arm furnished with Dodge Speed Reducers. Overload pressure instantly loosens the belts, cuts off the power, and, when desired, activates a warning bell, siren or light.

Dodge Torque-Arm Speed Reducers are available in two series—Single Reduction and Double Reduction—with capacities from 1 hp to 43 hp, speeds from 12 to 330 rpm. Write for details, including special data on the new Tri-Matic Overload release.

DODGE MANUFACTURING CORPORATION
2800 Union Street, Mishawaka, Indiana

DODGE

Tri-Matic Overload Release

FOR THE FAMOUS DODGE TORQUE-ARM SPEED REDUCER

1 LOOSENS THE BELTS

2 CUTS OFF POWER

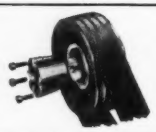
3 GIVES A WARNING

SET!
Overload Release is set, belts are tight, speed reducer in operating position. Release is interchangeable with standard torque arm.

TRIPPED!
Overload pressure has caused piston of Tri-Matic to plunge through unit, loosening belts, cutting off power, setting off alarm.

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.



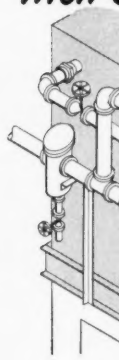
SEALED LIFE V-BELTS AND TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCER

ROLLING GRIP AND DIAMOND D FRICTION CLUTCHES

Are
Doin

...on



In steam supp
Ferro Chemic
individually

Specifications
steam pressur
reduced press
fluctuation w
is operated.
ferent temper
ments.

Specificatio
Pressure Reg
and installed

In service
ruption, Cran
plete satisfac
cost to date:

The Complete

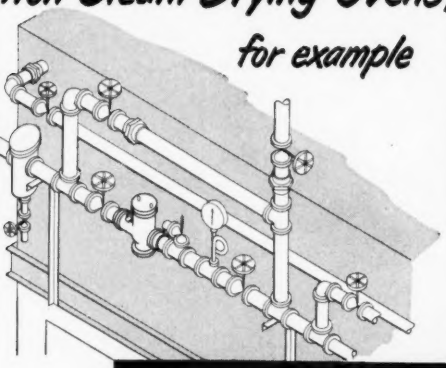
CR
CRANE

VALVES

FOOD EN

Are Your Pressure Regulators Doing As Well?

...on Steam Drying Ovens, for example



THE INSTALLATION

steam supply line to battery of 2 drying ovens at
ro Chemical Corporation, Bedford, Ohio. Ovens
ividually controlled by thermostatic valves.

THE HISTORY

cifications called for a valve to reduce initial
m pressure of 70 psi to 13 psi, and to maintain
uced pressure automatically without significant
tuation whether one, or both, or neither oven
perated. Ovens to be operated at same or dif-
nt temperatures, depending on process require-
nts.

pecifications were met with one No. 960 Crane
ssure Regulator, properly selected for capacity,
installed with adequate drainage of condensate.
n service now more than 5 years without inter-
tion, Crane Pressure Regulator is giving com-
e satisfaction. Working like new; maintenance
to date: zero. Remarkably simple to adjust.

VALVE SERVICE RATINGS

SUITABILITY:
Does everything claimed for it

MAINTENANCE COST:
None; working like new

CORROSION-RESISTANCE:
Steam only - corrosion no problem

SERVICE LIFE:
In 5 years; no sign of wear

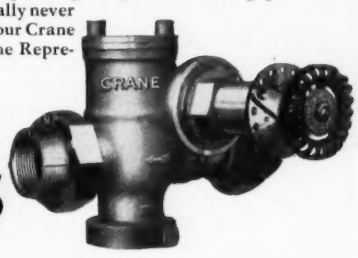
OPERATING RESULTS:
No fluctuation of oven heat

PRICE:
Good buy

AVAILABILITY:
Regular Crane item

THE VALVE

Crane No. 960 Brass Pressure Regulator reduces 250-Pound steam or air inlet pressure up to 80%. Available for operation at any of 4 pre-set ranges within 1 to 200 pounds outlet pressure. Adjusts easily within any set operating range. All wearing parts renewable; virtually never wears out. See your Crane Catalog or Crane Representative.



Complete Crane Line Meets All Valve Needs. That's Why
More Crane Valves Are Used Than Any Other Make!

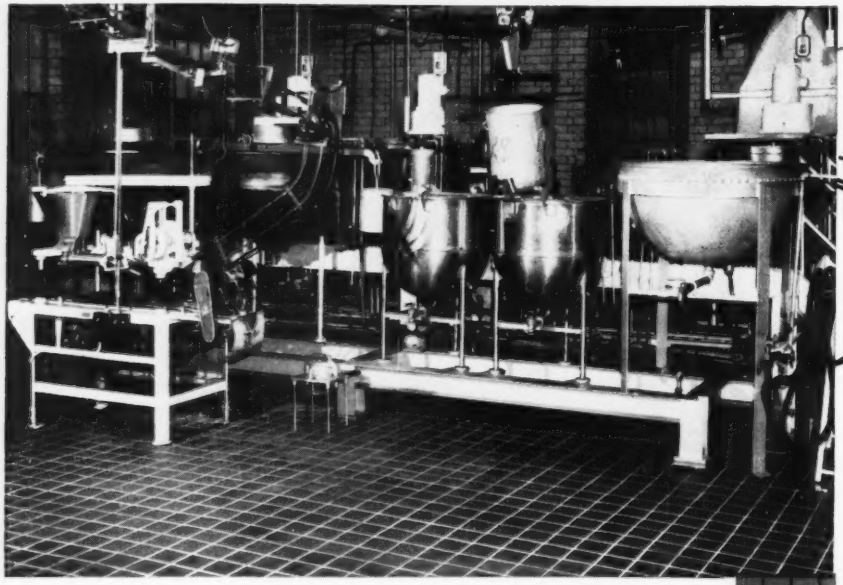
CRANE VALVES

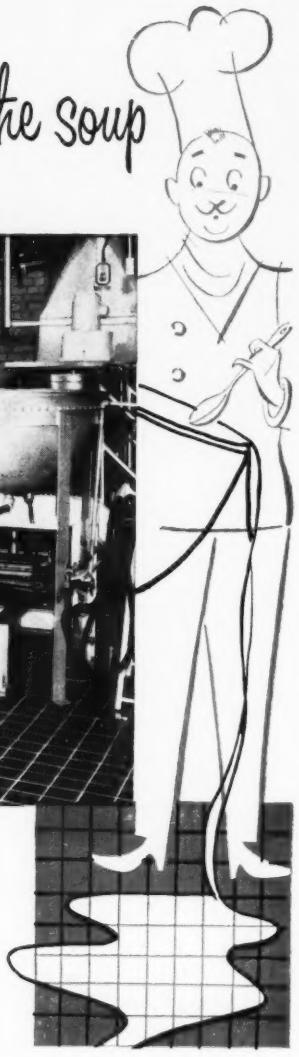
CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

ALVES • FITTINGS • PIPE • PLUMBING • HEATING

no harm done if the chef spills the soup

Mosaic Carlyle Quarry Tile floor in Stegner Food Products Company plant, Cincinnati, Ohio.





this floor is Mosaic Carlyle Quarry Tile*!

In Stegner's modern food processing plant, Mosaic Carlyle Quarry Tile floors give management the upper-hand in the *battle of sanitation*. Smooth, tough surfaces, impervious to moisture and bacteria, cut maintenance expense.

Equally important, Mosaic Carlyle Quarry Tile gives a lifetime of "trouble-free" service while its distinctive beauty improves plant appearance, employee morale.

When you build or remodel, use Mosaic Tile. For quick facts, consult your nearest Mosaic office. For helpful literature on the many types of Mosaic Tile, write Department 25-11, The Mosaic Tile Company, Zanesville, Ohio.

*Mosaic Tile meets all Food & Drug Administration standards of sanitation.

THE MOSAIC TILE COMPANY

(Member—Tile Council of America)

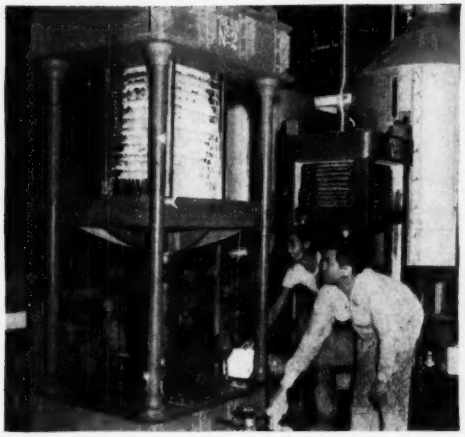
MOSAIC®

Offices, Showrooms and Warehouses across the nation

Over 4000 Tile Contractors to serve you

Branch Offices: Atlanta • Boston • Buffalo • Chicago • Denver • Detroit • Little Rock • Los Angeles • Miami • Milwaukee • New Orleans • New York • Philadelphia • Pittsburgh • Portland • St. Louis • Salt Lake City • San Francisco • Seattle • Washington, D. C.

For free Estimates on (MOSAIC) Tile, see your phone book for the name of Your Tile Contractor (Ceramic)



1 ENZYME STEP of process starts after milk coming from this press is centrifuged. The resulting cream goes in maturing tanks, where enzymatic action proceeds.

2 FREEZING STEP follows in this continuous unit. Here, low temperature ruptures the obstinate protein envelope, facilitating recovery of oil inside.

Simple, Direct
Extraction of Coconut Oil

Promising new technique skips tedious, costly copra operation by working "right from the meat." And thus former need for refining is written off, too

McGRAW-HILL WORLD NEWS

A recent technical development in the Philippines is seen ringing down the curtain on one of the most cumbersome and wasteful methods of extracting a vegetable oil from its meat.

Until now, all coconut oil of commerce has been produced from copra, an intermediate product of the fresh nut kernel. And this has required elaborate refining after extraction.

Finding of a satisfactory and cheap method of extracting pure oil direct from fresh coconut meat has long been regarded by East Asia coconut planters as the best insurance against the encroachment of competing vegetable oils.

Just Two Steps

Coconut Processes, Inc., Manila, believes that it has turned the trick. It controls the process and patents developed by a Spanish chemist, Pablo Robledano, and his Filipino research partner, Eduardo Ruiz de Luzuriaga.

The novel physico-chemical principle underlying the new process is the breaking up of the intractable protein envelope enclosing the oil globule in the fresh meat—(1), by carefully controlled enzymatic action, then (2) by rupturing the envelope by chilling (see photos above).

Previous attempts to achieve this have revolved about treatment by high temperature, but this resulted in deterioration of the oil.

The R-L process, as it is called, is covered by Philippine Patent No. 1, issued in 1948. Applications are pending in other coconut-producing countries, as well as in the U. S.

A pilot plant costing $125,000 has been operating for some time at Calamba, Laguna, producing up to 5 tons of oil a day. Economic plant capacity is around 10 tons a day. This size operation is small enough to permit the installation of a great number of decentralized plants within easy reach of the coconut-supplying plantations. Thus, transportation costs and spoilage are minimized.

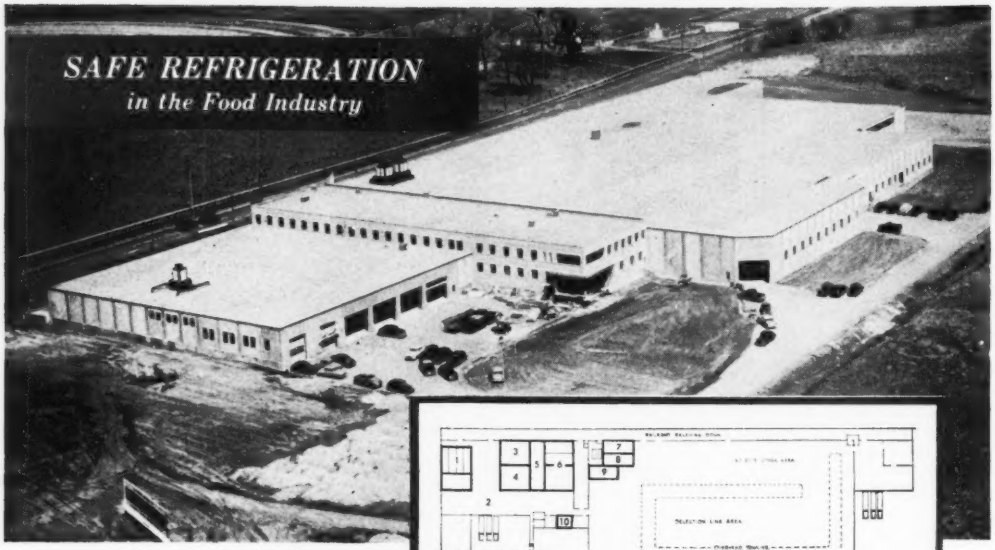
Coconut Processes, Inc., works in conjunction with Southwestern Engineering Co., Los Angeles. The latter firm specializes in industrial handling equipment and heavy media separaration. An engineering consultant of Southwestern visited the Philippines early this year to expedite plans for erection of a number of 10-ton units throughout the islands. Franchises and licenses covering most provinces have already been let, according to the CP people.

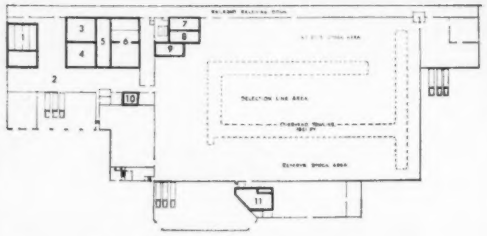
R-L plants consist of standard equipment items as used in unit operations in the food processing, chemical, and mining industries.

Production of the oil is not a straight-line procedure but involves several branch operations.

How It's Done

Nuts are halved and the kernels removed manually. Mechanical equipment may ultimately perform this job. Research is in progress to recover valuable products from the coconut water ("milk"), which now goes to waste. Good use is made of the woody shells. They serve as boiler fuel and furnish all the power required in sub-





Air view of the vast Tolerton & Warfield food warehouse and small-scale drawing of first floor plan.

1. Banana rooms. **2.** Dry produce storage area. **3.** Dry cooler room. **4.** Wet cooler room. **5.** Refrigerated holding corridor. **6.** Cooler rooms. **7.** Cheese cooler. **8.** Freezer room. **9.** Meat cooler. **10.** Shower and toilet. **11.** Equipment room.

18 "Freon"-operated units

insure dependable refrigeration for huge food warehouse

The recently built wholesale food warehouse of the Tolerton & Warfield Co., Sioux City, Iowa—operators of 90 Council Oak Food Stores—is one of the largest and most modern in the nation. It covers more than five acres . . . contains over 224,700 sq. ft. of floor space . . . has fully air conditioned offices, cafeteria, kitchen and rest rooms . . . coolers for dairy products, produce, smoked and fresh meats, and a freezer room for frozen foods. Banana rooms maintained at a steady temperature of from 68° to 70°F., with a fine spray of moisture, provide high humidity for proper ripening of the fruit in from two to four days.

Ten "Freon"-charged condensing units and eighteen cold diffusers of *Carrier* manufacture are used for product refrigeration. Eight "package units" provide air conditioning. The decentralized design of these compact installations is a protection against possibility of the warehouse's being without refrigeration at any time. It insures dependable, low-cost service 24 hours around the clock.

"Freon" refrigerants are used exclusively. They're ideal for every type of application throughout the food industry . . . in processing and transportation as well as for storage. They are safe . . . nonflammable, nonexplosive, virtually nontoxic, harmless to foods, fabrics and finishes. The chemical purity of "Freon" refrigerants safeguards the equipment . . . furthers the economical, trouble-free performance of the machines . . . prolongs their usefulness. And "Freon" refrigerants meet all building-code requirements everywhere.

These are important reasons why air conditioning and refrigeration manufacturers, engineers and contractors enthusiastically recommend installations that are "Freon"-charged. There are many excellent machines available to meet any requirements you may have. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

KINETIC

"FREON" *safe refrigerants*

DU PONT

"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

150th Anniversary

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

sequent operations, plus plenty to spare.

The meat is grated in a comminuter and pre-pressed, yielding about even proportions of coconut milk (not to be confused with the "milk" enclosed in the kernel) and a semi-cake. Flaking and pressing of this cake yields additional milk, which is processed together with that obtained from the fresh grated meat.

Centrifuges Used

Centrifugal separation of the milk yields a cream, "skim milk," and a small amount of protein. The cream is pumped into maturing tanks and subjected to enzymatic action under close temperature and pH control, then chilled in a continuous freezing machine. Chilling is followed immediately by melting. The cream is now ready for centrifugal separation, which removes most of the oil. After filtering it is ready for storage.

The balance of the cream is again chilled, melted, and sent through a centrifugal classifier, which removes the remaining oil and separates that which is left into water and proteins. Additional protein is obtained by heating and then centrifuging the skim milk.

In the meantime, the process continues in a branch production line on the flaked and pressed semi-cake. It is dehydrated in a drying unit, and an expeller then strips it of the remaining oil.

R-L vs. Copra Method

The oil contains only a negligible quantity of free fatty acids and is claimed to be substantially identical in composition and flavor with the unextracted primary coconut oil. This is said to be due to the fact that it is not subject to bacterial and mold action, as coconut oil is in copra.

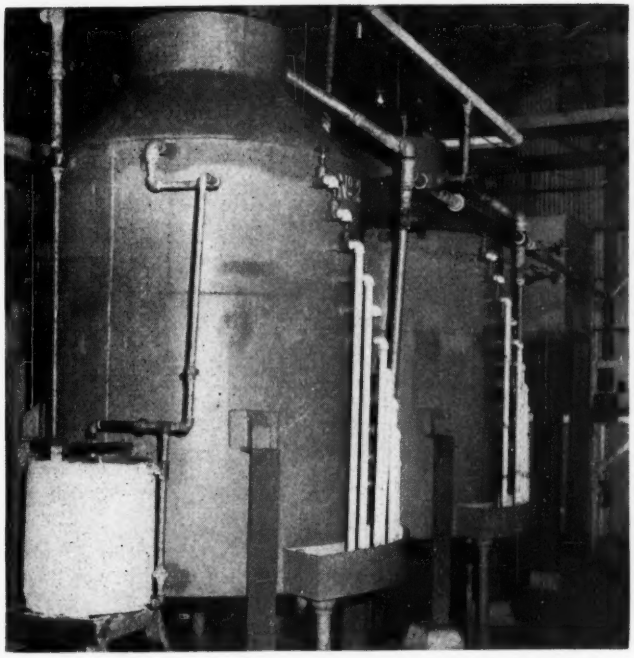
While the mechanical extraction loss by the R-L process is a fraction of 1 percent higher than by the copra method, there are no losses through chemical deterioration or in refining (since no refining is necessary).

The overall oil-recovery rate in terms of fresh nut meat is reported to be 10.21 percent higher.

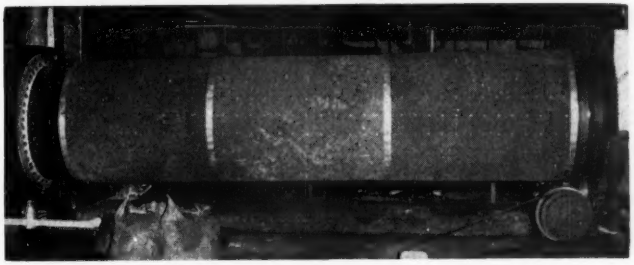
Additional economies are expected from the development of outlets for the protein constituent of the nut in the food and pharmaceutical industries. The proteins are not recovered in the copra method.

Also, the copra meal resulting from the R-L process is claimed to be a product of potentially higher value than copra cake.

Suggested possibilities for this meal include its use as a base for cereals.



AFTER FREEZING treatment, the cream is melted down in these units. It then goes to the centrifugals that spin out the finished, high-grade oil.

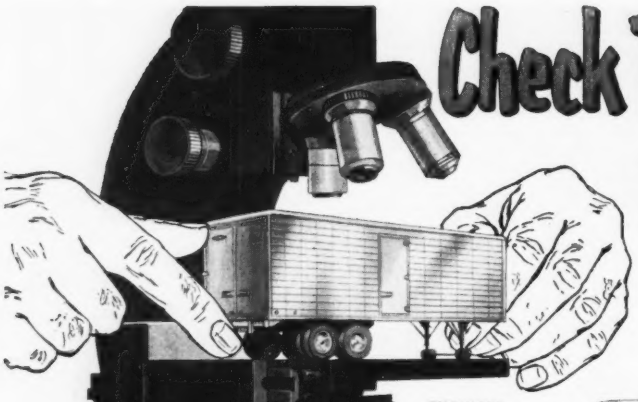


IN A FURTHER step, the wet cake that is recovered from pressing (seen in lead photo) is dehydrated into dried meal in this rotary unit.

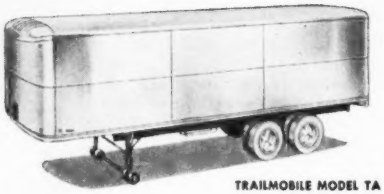
THEN meal goes to these expellers that take out remaining oil.

Check Trailmobile

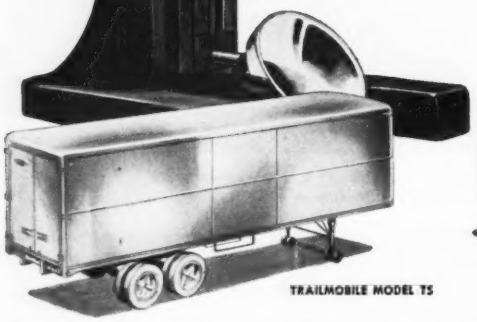
BEFORE YOU SELECT ANY FOOD TRAILER!



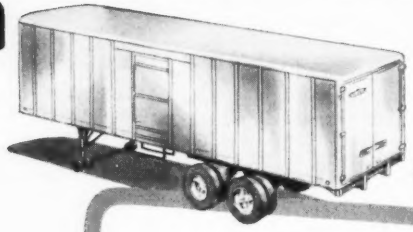
TRAILMOBILE MODEL A



TRAILMOBILE MODEL TA



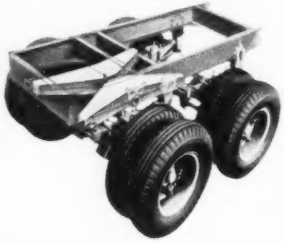
TRAILMOBILE MODEL TS



TRAILMOBILE MODEL EP

Pick the trailer best suited for your job ...from the *complete* Trailmobile line

What kind of foodstuff do *you* haul? Where do you haul it ... from farm, from warehouse, to retail outlet? Whatever your cargo and destination ... there is a rugged, lightweight Trailmobile model to do it at *lower cost.* No payload stealing dead weight—each Trailmobile delivers maximum payload at minimum operating cost. That's why more and more food men are switching to "load engineered" Trailmobile trailers. Trailmobile puts more *into* each unit ... so that *you* get more *out* of them in service, in earning power—now, and in the years ahead. Your friendly local Trailmobile dealer has all the facts about these better food trailers ... contact him *today.*



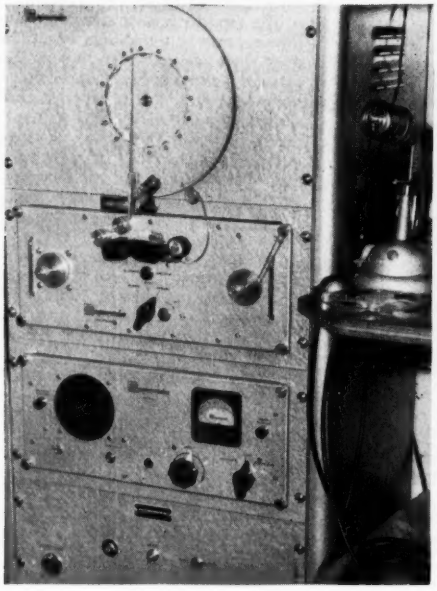
TRAILMOBILE
BUILDS THE FINEST TANDEM ON THE HIGHWAY TODAY!

With only two moving parts and two places to lubricate ... this tandem costs less to operate, less to service than any other unit on the road. Tires stay on the road. Stopping is safe, sure, chatterless—road shocks and braking strains are spread over the entire mechanism without shock.

***The Trend is to* TRAILMOBILE**

TRAILMOBILE INC.
Subsidiary of Pullman Incorporated
Cincinnati 9, Ohio • Berkeley 10, Calif.
Friendly Sales and Service from Coast to Coast

Tape-recorder setup **. . . quickly puts him "in the know"**



MESSAGE OF DAY is first "taped" at recording station (left photo). Then, at 11 a.m. it automatically ties in with company 'phone system and can be dialed by supervisors in any American Maize plant location. Note "mike" on table at right. Above: Superintendent Art Hazard keeps track of late company developments via desk phone when most convenient in his routine.

Supervisors Just Dial "80" —*And Get All the Facts*

Vital management decisions and company information are quickly spread to them via unique American Maize tape recorder-'phone network

FE STAFF

A company's ability to "turn-on-a-dime" in meeting market trends relies on smooth meshing of management decision with employee action.

And one way to do it is via an in-plant communication system—an organized means of quickly relaying important information to people on the job.

But despite progress in this technique, many firms continue to overlook a vital link—the supervisory group. Far too often the foreman or department head has to get such important news from his evening paper, or from the shop steward, or even at the corner tavern. Yet in any well-run operation these men are part of the management team.

To make the supervisor a strong link in its communication network, American Maize Products Co., Hammond, Ind., has put in a system that broadcasts company news to this group *first*—which in turn then quickly and effectively relays it to other workers.

Called the "Communicator", the heart of the network is a tape recording device that connects with the plant telephone system and broadcasts a daily message to those who dial the proper number. Thus, each day some member of top management records a message which "goes on" at 11 a.m. and is "dial available" to all supervisors until 9 a.m. next morning.

▶Today, with the Communicator in daily use, not only is the supervisory staff more effective in operational direction, but rumors are "spiked", labor negotiations speeded, and emergencies quickly met.

The system works on the same tape-recorder principle as used for weather, time, and air travel information in major cities of the country.

Each morning, by means of a microphone and recording mechanism, a 60 to 65 sec. message pertinent to supervisory personnel is recorded and "booked in."

System in Action

By using the conference 'phone number, 80, on the inter-plant telephone system, as many as seven supervisors can hear the message at the

HERE ARE JUST A FEW of the many possible subjects that are "fair shooting" for dissemination over the "Communicator": Changes in company policy, union matters, planning and development reports, activities of competitors, production information, new product data, quality control, personnel matters (promotions, training, insurance, social and athletic activities, holidays, etc.), inventory, plant tours, company in community affairs, departmental changes, company regulations, experimental equipment, research findings, good housekeeping, new methods, safety campaign, recognitions and awards. Many other topics will come to mind as pertinent in specific plants.

Model PA Carton Former in plant of Sawyer Biscuit Division, United Biscuit Company, Chicago

The machine you see here is making cartons from economical die-cut blanks . . . Far less costly than buying prefabricated cartons or blanks that have to be set up by hand . . . You'll notice, too, that there's no attendant at the machine—it simply has to be kept supplied with blanks. No labor problem here! . . . Finished cartons travel automatically to the packing stations.

Our Model PA Carton Former is adaptable to many different types of cartons and can be adjusted to accommodate different sizes. Has a speed of up to 102 cartons a minute.

Blanks are easily stored and take up a minimum of space. So you can buy in large and economical quantities, making your cartons as you need them. No delayed shipments to worry about—and you're always ready for peak demands.

Mechanically, the PA Carton Former is an outstanding piece of machinery—resulting in cartons that are firmly glued, neatly squared and accurately formed in relation to printed surfaces. Yes, you're sure of a quality carton when you install a PA Carton Former!

This machine is now serving many leading manufacturers. Let us show you how it would make your cartons—AT SUBSTANTIAL SAVINGS. Write our nearest office.

Literature on request

PACKAGE MACHINERY COMPANY • *Carton Division* • Springfield, Massachusetts

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS DENVER
LOS ANGELES SAN FRANCISCO SEATTLE VANCOUVER, WASH. TORONTO MEXICO, D.F.

same time. The eighth dialer receives a busy signal and must wait a minute for the circuit to be free.

The recorder is so arranged that the tape message automatically begins to play when dialed. Then, when the message has been heard and 'phone hung up, the tape is automatically stopped by a small circuit breaker.

Highly novel, the system received immediate acceptance. Listening time was obviously very heavy. However, because seven could listen at one time, it was difficult to tell exactly how many people dialed in.

As a start in checking this, company engineers rigged up a clock installation to gage the amount of listening time each day. Starting and stopping of the tape thus caused similar actions in the clock. Then, by setting the clock at 12 with each new message, it was possible to determine how long (cumulatively) any one message has been listened to.

The company is pleased to report that as many as 14 hr. of listening time have been recorded in a 24-hr. period. In this case, it was the vital subject of labor negotiations that was involved, with messages "worked" 'round the clock.

Message Subjects

The material for the company's labor-negotiation messages was developed during each bargaining session, then prepared as a short report to supervisors by the plant manager and immediately tape recorded. And in order that supervisors would know when a new message had been "put on", a special light signal was set up on the plant signal system to indicate the fact.

Emergencies—both company and employee—have also been dealt with in Communicator messages.

For example, one severe winter day as coal stocks were melting away, the company—via its message system—offered coal from its own dwindling supply to help employees who were in real need of fuel and unable to get it elsewhere. Foremen and department heads were asked to relay this to people in their departments, and to tell them that arrangements could be made through the industrial relations department. Response was immediate.

Another day, Assistant Plant Manager Harold Adams explained what had happened to the grind schedule and process schedule because of a boiler tube springing a leak two days before.

Still another facet of information was provided when President Sander reported on the most recent meeting of the Corn Industries Research Foundation, where many problems

common to the industry were talked over.

Perhaps the most pungent messages are those that spike rumors. For the recorder communiques originate from the most authoritative source in the company, and thus there is quick disposal of unfounded notions and warped facts.

A special advantage of the system is its contact of that "forgotten member" of line supervision, the shift foreman. He's the man who catches the graveyard shift from midnight to morning every third week, and spends a good deal of his time wondering what happened during the day. To him the "Communicator" represents a bridge between knowledge and speculation.

A secondary benefit is the large audience of hourly employees that has been attracted by the system. For while installed primarily for the supervisory group, the management soon deemed that there was nothing secret about it, and that all who had access to a telephone could listen. Thus hourly employees can also stay abreast of company developments and join in the feeling of unity and integration that the system has brought.

Total investment in buying and setting-up the system was something less than $1,000.

—*End*—

Shaker Improves Grading

—*Continued from page 99*

of parallel screens, each being hung on four double bearings. A motor was set below to drive these screens back and forth—in shaking or vibratory motion—by means of an upright shaft, eccentric cams, and connecting rods.

Beneath the screens, a traveling cleaning device was constructed moving at right angles to the vibration and gently forcing any lodged product upward out of screen apertures. A small drive shaft is used to move the screen cleaner, which is a series of parallel, soft rubber blades that wipe the under sides of the grading screens.

Parts for the invention were surprisingly inexpensive and handy—a tribute to the resourcefulness of the mechanic. To drive the screens, connecting rods from an old Lincoln car were used and, to show no favoritism, Plymouth connecting rods were used to move the cleaning devices.

Moreover, screens for the new unit are surprisingly cheap. Those employed in the current model cost only $2.19 each, compared with $275.00 for a single large rotary type screen replacement.

A 1½ hp. motor, totally enclosed and placed below and at the end of the unit, drives the screens. A small power takeoff from the same motor actuates the cleaning blades by means of a large eccentric.

Actually, the cleaning device employs a sort of windshield wiper action on the bottom of the screens as it gently pushes up and frees any lodged product. Each of the parallel frames of the cleaning device has four cleaning blades—thus movement of the cleaner frame is actually only one-fourth the width of the screen. The soft rubber blades work at angles which change with the forward and backward movement so that peas are pushed out and not sheared.

In developing the unit, a proper relation of screen pitch to the vibration frequency was necessary to perfect operations, so a variable drive to permit changes in screen vibration and a simple adjustment to change the screen pitch were included.

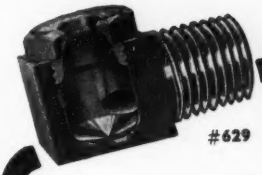
This new grader was developed and built entirely in the company's own shop. Further, no mechanical troubles

Coming Soon in FOOD ENGINEERING

Scores of practical "how" articles—all down-to-brass-tacks to help you produce higher quality foods at lower costs—are in preparation for early issues of FE. Just to name a few—

Revolutionary Graphic Panel Simplifies Process Control
Picking the Proper Screens for Most Efficient Sifting
Trends Speed Cannery Pace
Prepackaging Is Fanning Out in Meat Field
Compound Coatings for Confectionery
Now—Vegetable-Oil Ice Cream
Advanced Engineering Adopted in Brewery
Makes Macaroons Continuously
Treating Beverage Water To Improve Quality
One-Minute Test for Oxygen in Packages

LESS CLOGGING WITH MONARCH



#629

In many Food Processing plants Monarch Spray Nozzles are used to . . . .

Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

Remember

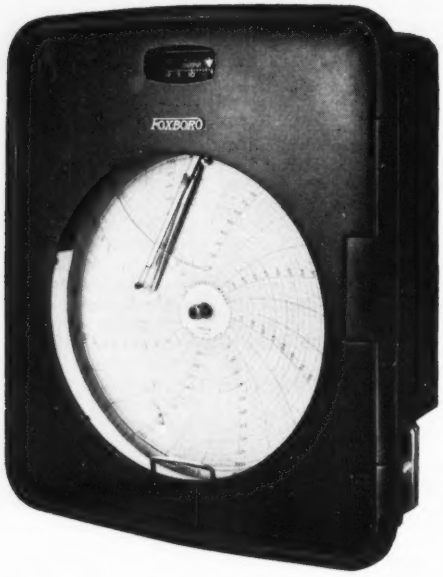
if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

MONARCH MFG. WKS., INC.
2517 E. Ontario Street
Philadelphia 34, Pa.

better measurement and control of

LIQUID LEVEL



In the measurement or control of liquid level — whether your problem involves turbulent, viscous or corrosive liquids, open tanks or closed pressure vessels — Foxboro offers complete diversity of premium-quality instruments to meet the requirements . . . and unmatched application experience to guide specification or design of the most efficient system for your operation.

INDICATORS • RECORDERS • CONTROLLERS
diaphragm, bubble tube, float, and differential pressure measuring systems for open or closed vessels
PNEUMATIC OR ELECTRONIC TRANSMISSION
• CONTROLLED VALVES

FOXBORO
Reg. U. S. Pat. Off.

For over 40 years, specialists in the measurement and control of temperature, pressure, flow, liquid level, humidity . . .

THE FOXBORO COMPANY · FOXBORO, MASSACHUSETTS, U.S.A.

nor design difficulties were encountered throughout the '52 pea pack.

A most gratifying aspect is the marked improvement in the quality of the current pack—skins and splits being practically nil as compared to packs graded by the old method.

Four screens are employed in the first model. Its capacity is about 250 cans of 303's per minute. However, double or treble capacity can be built into the machine by varying the size, speed, and pitch of the screen. And, any number of screens can be adapted, for grade sizes desired.

Patents have been applied for covering the unit's many unique and advantageous features.

End (*Resume reading on page 100*)

1-Building Efficiency

—*Continued from page 86*

blast of air from the blowers, are closed by gravity. This prevents escape of most of the heat supplied to the coils during defrosting.

Simultaneously with the interruption of the blower-motor circuit, controls operate to reverse the normal refrigerant cycle. Hot gas from the compressor is passed through the coils to defrost them. Then the normal cycle is restored when defrosting is complete. Duration of this latter interval is also controlled by the timer, at any selected period between 3 and 11 min. (For another unique control idea, see Item 3 in our "Simple Devices" panel.)

Unusual Operations Plan

In the new plant, all food products are processed by two major divisions of the company, each functioning in most respects as a separate entity. Until 1947, when the 50-year-old Murray Co., maker of fountain fruits and syrups, was merged with 75-year-old Johnson organization, whose primary products are bakers' supplies, each had its own long-established, efficient processing operations. Both functioned separately until brought together in the new plant in May 1951.

Here, each is under its own production management and laboratory control. And they continue as separate manufacturing operations—with only an imaginary line across the plant outlining the realm of each.

Both units draw bulk sugar from the common supply, however batch scale-recorded withdrawals are charged to each. Likewise, the volumes of syrups from bulk storage are registered on meters on the lines supplying each department: Only a few func-

MISSISSIPPI... First Again!

...with a New Livestock and Poultry Production Plan

Yes, Mississippi has scored another first. To encourage the state's rapidly growing livestock and poultry industry, the Mississippi legislature recently adopted an act and set up a guaranty fund to encourage banks and other lending agencies to make long term livestock and poultry production loans to qualified farmers of the state.

Mississippi, with 1,791,000 head of cattle on farms, leads all Southeastern states in beef and dairy cattle production. The production of poultry has increased by six times in the past five years, putting the state second in this field.

This thriving new industry offers unlimited opportunity to processors of livestock, dairy and poultry products and their by-products. And under Mississippi's BAWI law—another first among states—communities may vote bonds to provide a site and construct a building to house your industry.

You can't afford to overlook the opportunities offered under these two programs. Get the details today. Write:

MISSISSIPPI

MISSISSIPPI AGRICULTURAL AND INDUSTRIAL BOARD

The BAWI State

State Office Building
Jackson, Mississippi

Blast Cans Dry with AIR

NEWLY DESIGNED AIR BLAST CAN DRYER DRYS CANS AT HIGHEST SPEEDS WITH COOL BLASTS OF AIR

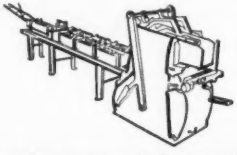
Here's can drying at its best—fast, efficient and thorough. The FMC Air Blast Can Dryer does away with cumbersome blotters, handles cans direct from the cooler. Direct blasts of cool air from the specially designed chamber literally wipe cans dry at speeds up to 450 cpm, depending on can size.

Designed to suit a variety of special requirements, this flexible unit is built for either horizontal installation, or inclined up to 45 degrees. Available in chute, cup or rubber star feeds, according to can size and capacity.

Among its many other advantages, the FMC Dryer permits immediate labeling and casing right from the dryer.

Cutaway view of air chamber shows how directional air blasts curb random diffusion of water, wiping cans dry as they progress through the machine.

FMC MODEL 3 NON-SHOCK CASER



Improved design for automatically casing 1,200 or more cans per hour. Eliminates damage to cans, labels and product through non-shock operation.

Write for new Bulletin No. 208A, which fully describes the FMC Air Blast Can Dryer, or call your nearest FMC representative.

Diversified fmc

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

tions, such as sales and top management, are shared.

By this unusual procedure, production employees of both organizations have been held together without the friction that often accompanies a readjustment period when two companies are combined. No training of inexperienced employees was necessary, none of the accumulation of know-how was dissipated.

End (Resume reading on page 87)

Candy Shelf-Life

—Continued from page 98

rancid odor and flavor—especially in caramels and butter creams. Still other substances may contribute to the burning aftertaste of rancid fats.

Cook[7] found lecithin to be an antioxidant which reduced surface tension and thereby improved the quality of fudges, caramels, toffees, and brittles.

Glycerine[8] was found to effectively suppress free fatty acid formation in butter creams. The shelf-life at 86 deg. F. was extended from 9 to 14 weeks with 1 percent of glycerine. Two percent glycerine gave indications of even longer keeping qualities.

An antioxidant, Tenox II, was used in five candies to determine its effect on organoleptic scores and chemical rancidity after six months' storage. The results are reported in Table III.

Chocolate-coated spun peanut butter and chocolate-coated peanut roll bars (containing nuts coated with zein and an antioxidant) were scored considerably higher than those not containing an antioxidant. There was very little difference in moisture content of candies with or without the antioxidant. The moisture in the candy containing nuts coated with zein and the antioxidant was 0.2 percent higher than those that were untreated.

Peanut planks, without an antioxidant or glaze, were scored higher than those containing an antioxidant and glaze, but there was no difference in moisture content. There was no apparent difference in coconut drops (with or without antioxidants) since they did not stale in the six-month period. After a longer storage life, it is probable that the beneficial effect of the antioxidant will be noted.

No differences in scores were noted on pan-coated peanuts (with or without an antioxidant), but those with an antioxidant had a 0.7 percent lower moisture content. Both candies were quite stale. However, the staleness was in the coating rather than in the nuts.

In general, it was found that the

NEW 6-7000 lb FORK TRUCKS BY CLARK EQUIPMENT

They're as Modern as your planning for the Future

The NEW, Improved UTILITRUCS... *set a new high in fork-truck design and construction*

Advanced features insure longer life, lower cost, greater ease of operation, and increased work capacity. They are rougher and tougher than any handling job in the 6,000-7,000-pound range, that any stevedoring boss, foundry boss or steel-mill foreman can dream up.

The detailed features of these new UTILITRUCS show why they master the ever-increasing burdens put upon materials handling equipment by modern production methods and techniques. See for yourself why they set new high standards for the fork-truck industry.

BOTH *POWER* TYPES...

HAVE ALL THESE IMPROVEMENTS...

- √ COMPACT—MANEUVERABLE
- √ NEW FORK MOUNTING
- √ 25" FREE-LIFT
- √ INCREASED DRIVER VISIBILITY
- √ CENTER-PIVOTED STEERING AXLES
- √ EASE AND CONVENIENCE OF SERVICE
- √ INCREASED DRIVER COMFORT
- √ CUSHION TIRES STANDARD

CLARK ELECTRIC AND GAS POWERED **FORK TRUCKS**
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 14, MICHIGAN

Please send: ☐ Utilitruc literature ☐ Material Handling News ☐ Have Representative Call.

Name_____

Firm Name_____

Address_____

City_____ Zone____ State_____

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

. . . but are they reaching for your products?

Fibre Cans

Folding Cartons

It depends upon the package—in these self-service days! And that's why so many food manufacturers depend on Ritchie. They know that Ritchie packages are styled to catch the shopper's eye, and start her hand a-reaching. They know, too, that Ritchie packages are practical—that they pack and stack and protect what's in them. Don't you want to talk to Ritchie? It will get more people reaching for *your* products!

HAND YOUR PACKAGING PROBLEM TO W. C. *Ritchie* AND COMPANY

4833 Baltimore Ave., Chicago 17

New York, Los Angeles, Detroit, Dallas, Boston, Providence, St. Louis, Cleveland, Seattle, Jacksonville

SEND FOR THIS VALUABLE FREE BOOK!

"101 Ways to Get Better Packaging"—it's yours for the asking. Also gives complete information on Ritchie's broad service and line: Folding Cartons, Set-up Boxes, Fibre Cans, Transparent Packages, Paper Spools, Tubes, Cores, Point-of-Purchase Displays and Dispensers. Write today!

effectiveness of the antioxidant depended upon the kind of candy.

Humectants Control Moisture

Several ingredients—such as corn and invert syrups, honey, and other mixtures of sugars in which levulose is a constituent—regulate moisture absorption or drying out.

Martin[9] found sorbitol beneficial for controlling moisture retention in fudge and pectin jellies. It has also been reported[10] that the properties of sorbitol in stabilizing moisture in candies are similar to, but more desirable than, those of glycerine and propylene glycol.

Cosler[11] stated that the Quartermaster Corps required that candy bars and disks should remain good for two years at 70 deg. F. or six months at 100 deg. F. The emulsifiers, sorbitan monostearate and polyoxyethelene sorbitan monostearate, greatly improved both the centers and the coatings of candies.

Grover[12] reported that the keeping qualities of candies were extended by lowering the vapor pressure. This was done by reducing crystalline sucrose, decreasing the water content, replacing sucrose with invert sugar, substituting invert sugar for glucose, and incorporating glycerine, sorbitol, or other humectants.

Using Sorbitol

Tests were conducted on twelve candies to which sorbitol of varying amounts up to 13 percent was added (see Table IV). In most cases, a 70 percent solution of sorbitol was only used in those candies in which corn syrup was normally added.

Addition of 13 percent sorbitol (dry basis) to chocolate-coated fudge bars prevented cracking of the coating and reduced moisture changes in the centers during six months' storage at 70 deg. F. Chocolate-coated coconut cream disks with 4 percent sorbitol (dry basis) were scored higher after six months' storage than similar bars with 8 percent sorbitol.

Caramel-nougat and starch-jelly bars with 8 percent sorbitol (dry basis) had about 1 percent more moisture and equally good flavors after 6 months' storage as bars with 5 percent sorbitol. There was no difference in scores of cholocate-coated coconut bars, with or without 10 percent sorbitol.

Other Candies

Graining and moisture changes were less in chewy caramels when the amount of sorbitol was increased from 5 to 8 percent. Graining occurred at 70 deg. F., or above, after three months' storage and continued for six months. It began on the surface and

NOW

...you can determine moisture content

rapidly, accurately, automatically!

THE BECKMAN AQUAMETER

The Beckman Aquameter brings added speed and accuracy to routine moisture analyses of such products as pharmaceuticals, alcohols, ethers, solvents, antibiotics, food products and a host of other materials sold on a moisture-free basis. It is also extensively used in processing operations where moisture is a key in dication.

Other techniques now used for determining moisture (oven-drying, distillation, etc.) are tediously time-consuming and necessitate complex expensive equipment. Manual titrations require the skill of highly trained technicians experienced in interpreting and identifying gradual color variations. But the simple, fully automatic operation of the Beckman Aquameter reduces titration time to an average of only one or two minutes, and most titrations can be reproduced to within ± 0.05 ml.

Titrations performed on the Aquameter are reproducible to 0.05 ml of KF Reagent, which corresponds to a few tenths milligram of H_2O—a sensitivity unsurpassed by any other routine method.

The Beckman Aquameter applies a new principle to the "dead stop" technique, recognized as the most sensitive of the instrumental methods for Karl Fischer titrations, and recommended by the U. S. Pharmacopoeia. Initial adjustment is simple and easily made, and any number of sequential titrations can be carried out with no further checking or setting, simply by adding the sample and pushing a button. The titration is completed automatically and without attention.

For full details write for Data File #41-18

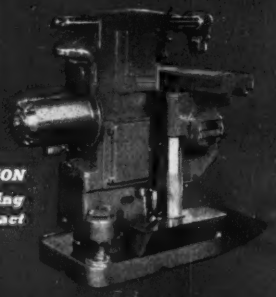
BECKMAN INSTRUMENTS control modern industries

BECKMAN INSTRUMENTS, INC.

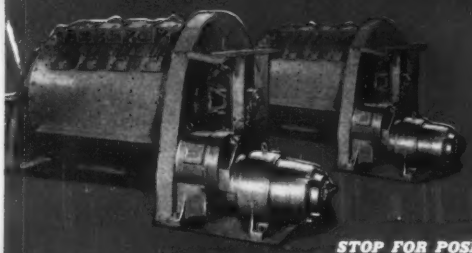
1B SOUTH PASADENA, CALIFORNIA

Factory Service Branches: New York—Chicago—Los Angeles

BECKMAN INSTRUMENTS include: pH Meters and Electrodes • Spectrophotometers • Radioactivity Meters • Special Instruments



SPEED UP PRODUCTION
Save time by stopping quickly with a compact integral brake unit

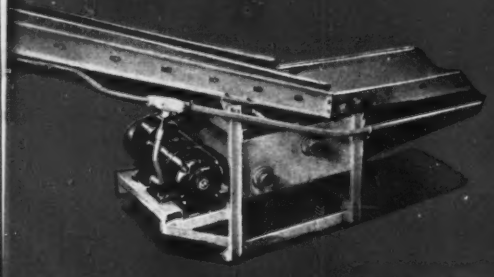


STOP FOR POSITION
Stop at the desired point for quickly and conveniently loading and unloading

MASTER UNIBRAKE MOTORS

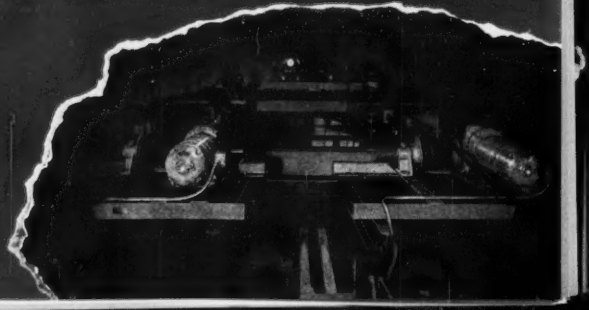
1/8 TO 125 HORSEPOWER

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO



STOP FOR SAFETY
Reduce the hazard of injury to workmen or damage to equipment which might cripple vital production

STOP AND HOLD ANY LOAD
Unibrake motors are very advantageous on hoist, elevators, inclined conveyors, etc. ...



progressed evenly toward the center. However, there was no objection by the taste panel to this partial graining.

Candy corn with 3 or 5 percent sorbitol was scored higher, and it had a slightly higher moisture content than samples without it. However, candy corn containing sorbitol lost luster, faded, and became slightly translucent.

Gum drops without sorbitol were scored higher than those with 5 or 10 percent sorbitol. Dulling of the finish and sweating of gum drops were about doubled by the use of 5 percent sorbitol, and doubled a second time by increasing it to 10 percent. It is believed that less than 5 percent sorbitol would be beneficial to the texture of gum drops.

Weighing the Results

From these results, it was apparent that the advantages of sorbitol varied with individual candies. Benefits from its use in fudge and chewy caramels were outstanding. The advantages of sorbitol in candy corn and grained caramels were slight. There appeared to be no benefits from its use in caramel-nougat bars, coconut drops, or starch jellies (with or without fruit). But the effect of adding 5 percent sorbitol to gum drops was detrimental. In no case did sorbitol affect the flavor of the candies.

Reference and Bibliography

1. J. G. Woodroof, and Helen H. Thompson, "What Refrigeration Does for Candy," *Refrig. Eng.*, 58, 1169-72, 1221, 1950.

2. J. G. Woodroof, H. H. Thompson, and S. R. Cecil, "Cold Stored Candy," *Food Ind.*, 22, 1356-67, 1950.

3. "Refrigerated Candy Keeps Better", *Ice and Refrig.*, 120, 4, 57-59, 1951.

4. Guston F. Becker, "Fats and Oils in Candy," *Candy Industry*, 14, 5, 20, 29, 1951.

5. Kenneth T. Farrell, and Justin J. Allkonis, "Army Rations: Shelf Life Lengthened Quality Maintained by Development of New Type Cocoa Coating," *Candy Ind.*, 15, 15, 18, 1952.

6. Helen W. Robinson, "A Story of the Stabilization of Fats Incorporated in Candy," *Food Tech.*, 5, 1, 20-24, 1951.

7. L. Russell Cook, "How Lecithin Affects Cost and Quality of Candy," *Food Ind.*, 21, 449-451, 1949.

8. "Shelf Life of Butter Creams Lengthened by the Use of Glycerine," *Manufacturing Confectioner* 32, 4, 70, 1952.

9. L. F. Martin, "Candy Research," *Candy Ind.*, 15, 20, 1952.

10. "Sorbitol, Its Properties and Use in Manufacturing Confectionery," *Candy Industry*, 14, 6, 31, 1952.

11. H. B. Cosler, "Better Quartermaster Rations," *Candy Industry*, 15, 188, 5, 20, 1951.

12. D. W. Grover, "Keeping Qualities of Confectionery As Influenced by Its Water Vapor Pressure," *Jour. Soc. Chem. Ind.*, 66, 201-205, 1947.

End (Resume reading on page 99)

season it right with

SPICEOLATES® and/or SPISORESINS®

SPICEOLATES, water-soluble spice flavors made from pure natural essential oils and oleoresins, are unsurpassed for seasoning food products containing a high percentage of water such as pickles, condiments and sauces. When SPICEOLATES are employed to season such products the flavor remains uniform throughout.

SPISORESINS, latest advance in oleoresin manufacture. New, superior spice flavors in compact, convenient containers. Pourable, non-solidifying, as easy to use as essential oils, SPISORESINS are vastly superior in flavor value and more convenient to use than dry spices. In all basic and over 60 different compound flavors.

SPICEOLATES and SPISORESINS are available in all basic and many compound flavors—Brochures will be sent on request and special formulas developed to meet any specific requirement.

D&O ESTABLISHED 1796 REG. U. S. PAT. OFF.

DODGE & OLCOTT, INC.

180 Varick Street • New York 14, N. Y.

SALES OFFICES IN PRINCIPAL CITIES

ESSENTIAL OILS • AROMATIC CHEMICALS • PERFUME BASES • FLAVOR BASES • VANILLA

NEW PACKAGES & PRODUCTS

New Lemon Juice in a New Tubed Package

"Tuba-Lemon", a frozen concentrated lemon juice packed in collapsible aluminum tubes, is being marketed by Golden Citrus Juices, Inc., Fullerton, Calif.

This represents a completely new product as well as a revolutionary packaging idea in the frozen food industry. Exhaustive laboratory tests were made to perfect the product, and experimentation continued until all problems relating to composition, keeping qualities and container were satisfactorily worked out. The item was first put on a limited distribution basis, but due to favorable response received it is expected to go into national distribution in the near future. An institutional size is also contemplated.

Partial Dispensing Feasible

The product, a highly concentrated pure lemon juice, has about the consistency of thick honey, and can be squeezed from tube without defrosting. Only the desired amount need be extruded after which the unused portion can be returned to the refrigerator. This method of dispensing has the advantage of not having to use the entire contents of package at one time or holding over contents in an open container. This means the remaining juice does not come into contact with air, thus avoiding a prime cause of flavor and vitamin deterioration in citrus. Although it will not spoil at room temperature the flavor will gradually deteriorate. It is recommended that it be kept in freezer compartment.

The 2-oz. tube reconstituted 6-to-1 with water equals the juice content of 12 average size lemons. It is said to mix readily with water and have the bouquet, flavor, and appearance of freshly squeezed lemons.

To produce this product, lemons are washed and graded. After juice is extracted, it is put through a standard low-temperature concentration and freezing process. After it is concentrated at high vacuum and low temperature it is slush frozen and automatically filled into aluminum tubes.

These tubes, provided by Victor Industries Corp., Brooklyn, N. Y., are of pure aluminum of SO-20 hardness, 1⅜ in. in diameter and 5½ in. in length, and are made by impact-extrusion methods. Closures, also furnished by the Victor company, are lemon-yellow urea plastic caps.

Tubes present an attractive, eye-appealing item, in their four color lithographed design which carries a smiling lemon-headed face with top hat, wearing two citrus leaves as a bow tie.

For added protection to tube and to enable company to educate the public on the many uses for lemon juice the tubes are placed in an individual four-color carton, carrying the same design as the tubes. This promotional campaign is carried on by means of a colorful folder—giving 28 tempting recipes—inserted into the carton. This folder also recommends lemon juice for such non-food uses as brightening aluminum, hair rinse, removing rust stains, etc. Upon request the consumer may also obtain another folder giving mixed drink recipes.

To stimulate sales, 12 of these individual cartons are packed in an attractive display carton that can be used by retailers in their refrigerator cases. The display cartons are packed nine to a shipping container and this is hard frozen in an air blast at 30 deg. below zero at the plant to provide safety during shipment. Cartons are furnished by Fibreboard Products Inc., San Francisco.

Price-wise this concentrated product competes with fresh lemon. In Eastern markets, size 432 lemons retail at an average of 50 cents a dozen the year round with the 2-oz. tube—the equivalent of 12 average-size fresh lemons—retailing for about 40 cents.

Trade name of "Tuba-Lemon" is registered to Golden Citrus Juices, Inc., but the company is making arrangements under which the product will be sold under private labels.

For Package Data Use Reader Service

Old Fashioned *Hot* Bread

A number of bakers are now introducing a hot bread idea, based on preheating bread at home immediately preceding a meal. Placed in the home oven for 15 or 20 min. at about 220 deg. F., the bread is said to recapture the fragrant, crusty goodness of a fresh-baked loaf. This procedure can be repeated even after a portion of the loaf has been removed from wrapper.

This result is obtained by use of a cellophane overwrap specially designed and furnished by Milprint, Inc., Milwaukee. The wrapper protects the bread during heating and holds moisture in the loaf.

Although presently devoted principally to white bread and rolls, it can be applied to other types of bread.

Among bakeries now merchandising hot bread are Mead's Bakeries, a multiple unit wholesale bakery operating in Texas, Oklahoma, and New Mexico; Spang Baking Co., Cleveland; Land O' Lakes Bakery, Wausau, Wis.; and City Baking Co., Akron.

For Package Data Use Reader Service

Which cap sells the IMPULSE SHOPPER?

In self-service stores, more than two-thirds of all purchases are decided *in the store*. That means your package has to be an eye-stopper to get its share of these impulse purchases. One good way to get attention for your package is to top it with a colorful cap.

Armstrong's designers will gladly suggest a design for your cap which will combine maximum eye-appeal with ample space for dealers' price marks. A special no-wax finish makes it easy to write or stamp prices on all Armstrong's Caps.

Housewives also prefer these handy caps because they open or close with a simple twist. Purity and flavor are safely locked in. And each time your product is used, the decorated cap prompts repeat sales by repeating your tradename, slogan, or sales message.

For complete information, see your near-by Armstrong representative or write Armstrong Cork Company, Glass and Closure Division, 8510 Prince Street, Lancaster, Pennsylvania.

Western Representative: I. F. Schnier Co., Inc.
San Francisco 7 and Los Angeles 12

Armstrong's Metal Caps

Packaging Headquarters for Armstrong's Glass Containers, Embossed-Top Corks, Crowns, Armold Plastic Caps, and Du Pont "Cel-O-Seal" Bands

"...add a pinch OF DOW CORNING ANTIFOAM A"

Eliminate waste space in your yeast fermentation tanks and vats, with a pinch of Antifoam A. Concentrations as low as 4½ parts per million effectively prevent fermentation foam, yet have no effect on the strength of the yeast.

That kind of performance is why you'll find that this remarkably effective silicone is the most economical defoamer you've ever used. Bland and non-inflammable, its high order of chemical and thermal stability prevents it from contaminating or reacting with most foaming media.

Easily dispersed in a wide variety of solvents, Antifoam A is effective in most aqueous foaming systems. Where solvents cannot be used, specify the new emulsified form of Antifoam A. Containing 30% Antifoam A by weight, this stable, easily dispersed suspension may be introduced directly without the use of carrying agents.

If high production costs are pinching your profits, pinch them back with Antifoam A. Evaluation samples are available upon request. Simply fill in and mail the coupon today.

DOW CORNING SILICONES

See for Yourself
Send for Free Sample

DOW CORNING CORPORATION
Dept. No. BF-22, Midland, Mich.
Please send sample of ( ) Antifoam A
( ) Emulsion of Antifoam A
Name_____
Address_____
City_____ State_____

DOW CORNING CORPORATION
Midland • Michigan

Cream For Your Coffee Now In Powdered Form

"Pream", an instant coffee cream product, is being introduced by M&R Dietetic Laboratories, Columbus, Ohio.

Prepared by a new patented process, and made from fresh cream, lactose, and non-fat milk solids, it is a 100 percent dairy product. After it is pasteurized and homogenized, it is vacuum-packed into 4-oz. "Key-Open" cans supplied by American Can Co., New York City.

The company reports this powdered cream will not sour, needs no refrigeration and will keep at room temperature for several weeks after the can is opened.

To use, it is necessary only to sprinkle a teaspoonful, more or less according to taste, on the surface of a hot cup of black coffee, then stir and drink.

The can is colorfully lithographed in an attractive label design of red, brown, and yellow to present good product identification. Preliminary test marketing indicates favorable acceptance of this new item and national distribution is expected to follow shortly.

For Package Data Use Reader Service

Don't Forget to Vote!

Several companies are inaugurating something new in food packaging by devoting space to a public service campaign urging everyone to register and vote. So, whether you are having cereal for breakfast, or a tall glass of beer at the end of the day, you are apt to be reminded of this fact.

Companies performing this service include the Kellogg Company, Battle Creek, Mich., and A. Gettelman Brewing Company, Milwaukee.

The Kellogg people, working with American Heritage Foundation which sponsored the Freedom Train, is devoting a good percentage of space on its corn flakes cartons to this cause. The front panel carries photos of both principal candidates and a direct appeal to every citizen to exercise his right to vote. Other information on back and sides include helpful voting and good citizenship data, instructions for proper display of the American flag in public, and a comparison of U.S. voting records in previous national elections with those of other countries.

The Gettelman company is putting special neck labels on approximately 5,000,000 bottles of its beer, reading "Get Out and Vote". This is a second in a series of special bottle neck labels used by the company, the first being in March when they paved tribute to the 1952 American Bowling Congress which was held in Milwaukee.

Coconut in Shorter Shred

"Dixie Cut" moist, sweetened coconut, has recently been developed by Durkee Famous Foods, Cleveland, and is being marketed in 5-oz. cans.

"Dixie Cut" is a short shred form which the company states makes it easier to mix and blend, easier to measure, and gives the consumer 25 percent more coconut per can because it can be more tightly packed. No flavoring has been added to the product which retains the natural flavor of pure coconut.

This coconut reportedly is well-suited as a mixing ingredient in baked goods, puddings, macaroons, fudge and other desserts, as well as a garnish.

Non-Lump Biscuit Mix

A new biscuit mix, called "Snap", is being test-marketed by Dobry Flour Mills, Inc., Yukon, Okla.

This mix was developed after extensive experimentation and contains all the necessary ingredients except the addition of water. The company reports that shortening used is of a type that keeps the mix free-flowing without lumps, each tiny particle of shortening being encased in a coating of dry milk, which dissolves and frees itself when liquid is added.

The product is packed in a glassine liner, which in turn is placed in a gaily illustrated 2-lb. Delta Seal bag, supplied by Bemis Bro. Bag Co., St. Louis, Mo., which also worked with the company on the package and its design. Glassine liners were recommended more for a safeguard against pressure rather than heat or humidity as tests indicated that the shortening used was stable even under higher than natural temperatures.

For Package Data Use Reader Service

WE CALL 'EM

Waterproof Bags

...BUT... THIS KIND OF PROTECTION IS ONLY ONE OF THEIR FUNCTIONS

Bemis Waterproof Laminated Textile Bags are extra strong, and they're specially constructed to guard against:

- Change in moisture content
- Sifting
- Escape of undesirable odors
- Loss from snagging and tearing

Up to 5-Layer Constuction:

1. Flexible creped kraft paper
2. Waterproof adhesive
3. Middle layer of paper
4. Waterproof adhesive
5. Outer layer of burlap or cotton

This may be parchment paper, or various plastic films, depending upon your requirement.

If you have a "hard-to-pack" product or one that must stand the rough handling of l. c. l., truck, or export shipment, it will pay you to investigate the advantages of Bemis Waterproof Bags.

Bemis

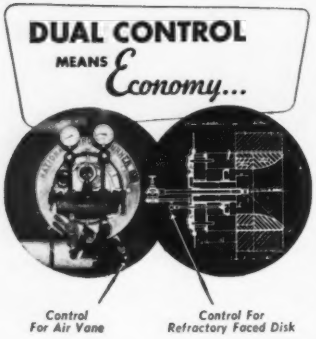
"America's No. 1 Bag Maker"

408-C Pine St., St. Louis 2, Mo.

MAYBE YOU NEED THESE, TOO

If you don't require the exceptional protection of Bemis Waterproof Bags, Bemis Multiwall, Cotton or Burlap Bags are your best bet.

WHATEVER KIND OF BAG YOU NEED, WE MAKE IT!



WITH

NATIONAL AIROIL

UNIVERSAL REGISTERS

AND

TYPE "SA" OIL BURNERS

. . . and *economy* means that you get *better performance* with NATIONAL AIROIL Universal Registers because they have a *dual feature* for controlling air volume independent of turbulence. Air vanes can be instantly reversed to change direction of turbulence while air volume is separately regulated by a refractory faced disk control. Both adjustments can be made while the Type "SA" Oil Burner is firing.

Another "dual advantage" of NATIONAL AIROIL Universal Registers is that they are equipped for dual fuel firing of gas and oil.

Universal Registers with Type "SA" Burners are available in three (3) sizes . . . capacities up to 60,000 lbs. of steam produced per burner per hour. *Write for Bulletin 51.*

OIL BURNERS and GAS BURNERS for industrial power, process and heating purposes.
STEAM ATOMIZING OIL BURNERS
MOTOR-DRIVEN ROTARY OIL BURNERS
MECHANICAL PRESSURE ATOMIZING OIL BURNERS
LOW AIR PRESSURE OIL BURNERS
AUTOMATIC OIL BURNERS, for small process furnaces and heating plants
GAS BURNERS
COMBINATION GAS and OIL BURNERS
FUEL OIL HEATERS
FUEL OIL PUMPING and HEATING UNITS
FURNACE RELIEF DOORS
AIR INTAKE DOORS
OBSERVATION PORTS
SPECIAL REFRACTORY SHAPES

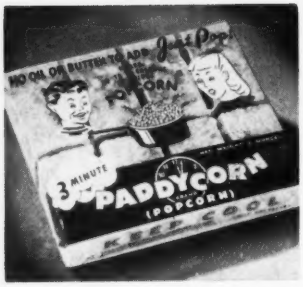
NATIONAL AIROIL BURNER CO.
MAIN OFFICE & FACTORY: 1272 EAST SEDGLEY AVENUE, PHILADELPHIA 34, PA.
Southeastern Division: 2512 South Boulevard Houston 6, Texas
Industrial Oil Burners, Gas Burners, Furnace Equipment

"Ready" Corn in New Pack

Though "PaddyCorn", a product of Popcorn Products Corp., Milwaukee, received good consumer acceptance when introduced a short time ago, the company was not entirely satisfied with the package. The former package (see photo, right) was wrapped, and formed one paddy divided into 8 sections. This package required refrigeration and also was subject to damage due to squeezing in handling.

Working with Keck Advertising Agency, Oconomowoc, Wis., the company came up with a package (see photo, above) that not only presented a better display item but one that could be handled as a shelf item with no refrigeration required for the product.

Molitor Box Co., Milwaukee, provided the new carton in the shape of a mailing tube with a lard liner—to make the product impervious to grease



and oil—with indented top and bottom sealers. This type container also allows for a maximum of display area for the labels which are furnished by Arandell Lithographing Co., Milwaukee. The very simplicity of design gives the label an impulse-buying impact.

The product itself was developed after surveys showed a general increase in the consumption of home-popped corn and the desire of the consumer to procure an item that would be simple and easy to prepare. To accomplish this the company worked out a process whereby the paddy contains both oil and corn so that nothing need be added.

Manufactured by a completely automatic process the correct proportions of oil and corn are deposited at the rate of one paddy every second and a half and then fed through a refrigeration tunnel after which paddies are packaged.

Each carton contains 4 paddies which will make up to 2 gal. of popcorn. One paddy is said to be enough for a generous serving for two. The consumer simply slides a paddy (or two) into popper or kettle, and in 3 min. it is converted into popcorn, ready to salt and serve.

For Package Data Use Reader Service

Package & Product Shorts

Sweden Develops Dehydrated Butter

Among the growing line of dehydrated products it is reported that Sweden has developed a powdered butter. The keeping qualities are said to be excellent and it is particularly suited for use in tropical and in semi-tropical countries.

Packaged Liquid Sugar

A 50 percent inverted pure cane liquid sugar that reportedly does not ferment or recrystallize, is being marketed by Sweet-Nes Corp., Brooklyn. It is ready to use full strength or can be diluted with tap water as needed. Packed in 8-lb., 6-oz., cans it is especially prepared for food processors.

Plastic Film for Fats and Oils

A vinyl plastic film, called 'K-flex BV", has been developed by R. L. Kuss & Co., Inc., Findlay, Ohio, especially for packaging fats, oils, shortening and essential oils. The film is non-toxic, making it particularly suitable for food products. It is available in pre-formed liners for inexpensive fibre boxes.

Holiday Wrappings

Folder containing samples of Christmas wrappings for confectionery and other food items has been made available by the N. T. Gates Co., Philadelphia.

Round Bottom Poultry Bags

Chase Bag Co., Chicago, is offering round bottom polyethylene bags, designed especially for packaging turkeys, ducks, geese, chickens, and other fowl. Bags are available in various lengths and widths. They are said to be odorless, moisture-proof, bacteria and mold resistant, nontoxic and airtight.

For Package Data Use Reader Service

For almost thirty-five years, we have produced ALVA imitation Maple and each year sales progressively increase.

The reason for this solid success is just plain "true-to-the-tree" goodness—for every use by bakers, confectioners, ice-cream makers, extract and syrup manufacturers.

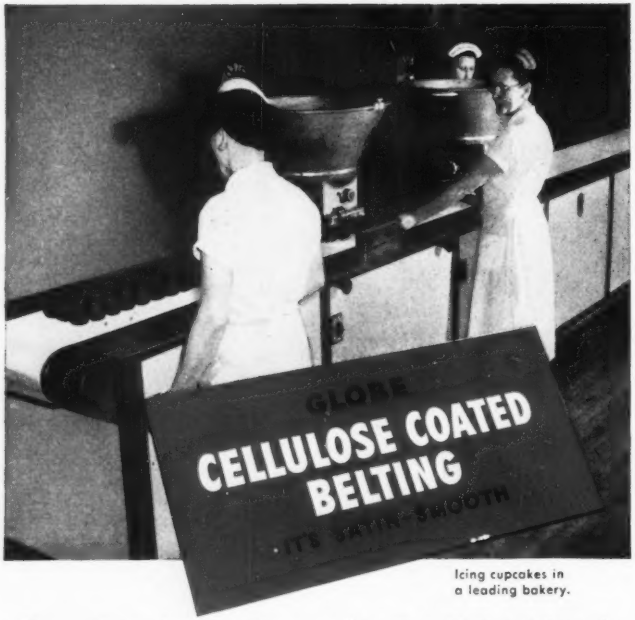
If you don't know ALVA Maple,
send for your sample now!

VAN AMERINGEN • HAEBLER, INC.

521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

fats and oils can't penetrate it! tacky foods won't cling to it!



Icing cupcakes in a leading bakery.

Convey the product . . . not the excess fats, oils and tacky substances! That's sound advice for any bakery or candy plant demanding product purity . . . freedom from contaminating flavors and odors from previous batches.

. . . and that's advice that can be carried out easily, *with consistent success*, if you convey your foods with Globe Cellulose Coated, Solid Woven Cotton Belting.

Its satin-smooth finish cannot be penetrated by fats or oils from excessively greasy products, making it ideally suited to doughnut-making machines. All grease remains on the surface, to be quickly and thoroughly washed away with soap and water. *The only completely sanitary way!*

Nor will tacky particles cling to Globe Cellulose coating, as they do to the rough, uneven surfaces of other belts. What better reason for such widespread use on cookie cutting machines and in candy plants?

Waterproof and heat resistant, possessing all the well known strength and wearing qualities of its solid woven cotton carcass, Globe Cellulose Coated Belting is the only satisfactory solution to conveying problems in many types of food industries, including packing plants.

Available in clear amber or opaque white, coated on the carrying side only or pulley side, too, it is manufactured in widths from 1" to 60" and in all standard plies.

Free samples and literature, plus the names of your local distributor, will be furnished promptly by writing Dept. F 10.

GLOBE **WOVEN BELTING CO., INC.**
KNOWN FOR QUALITY THE WORLD OVER

1400 CLINTON ST., BUFFALO 6, N. Y.

Local Sugar Processing

—*Continued from page 72*

ity. Also, there are high processing, materials handling, and labor efficiencies. Initial cost of a sugar plant is usually of secondary importance to its manufacturing efficiency.

This company's new type operation bears out all these standards.

Only three men are required to operate the Portland plant. All bulk-granulated sugar is moved into the storage silo and from it to any processing or delivery station by elevators, scroll conveyors, or chutes by push-button controls on the central control-panel. Gate valves and the four-way turret hopper are operated by electrical remote controls. Liquid sugar, corn syrup, and blend pumps are also actuated by pushbuttons.

It may be noted here that the most widely used blend is a mixture of 75 percent liquid sugar and 25 percent 42-DE (dextrose equivalent) corn syrup.

Granulated sugar can be supplied for delivery to customers or to the melting process on a continuous basis.

Material Handling

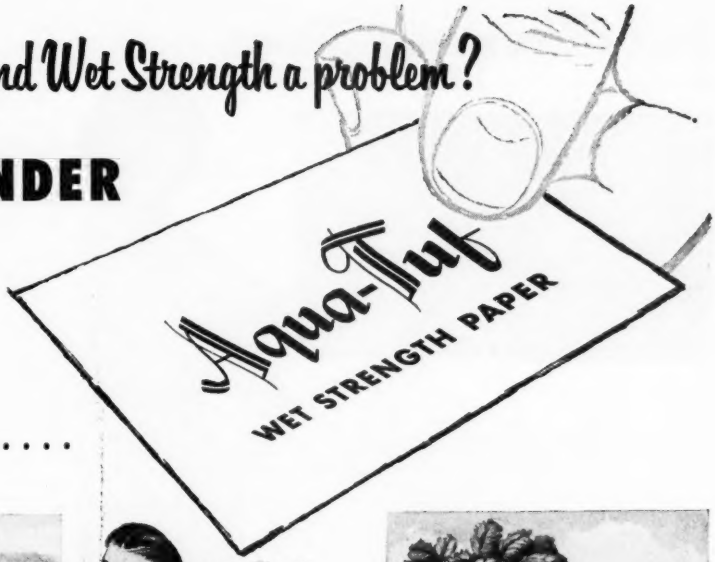
Bulk-granulated sugar, previously screened and classified at the refinery, is delivered to the plant from the company's Nampa, Ida., refinery in specially constructed, insulated rail cars. It is unloaded through a gate valve at the bottom of the car and flows by gravity into a flight conveyor, which moves it to the boot of the bucket elevator. It is then elevated to the top of the silo and transferred to another flight conveyor that distributes it through a series of ports into storage. The 35-ft. dia. by 110-ft.-high reinforced, concrete silo has a capacity of 4,000,000 lb. of sugar.

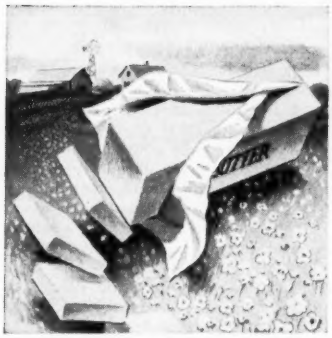
Sugar may be withdrawn from any one of a series of ten discharge gates located at the bottom of the silo. From these it flows into another flight conveyor and is moved to the boot of the elevator. By automatic controls the operator may route sugar from this point into the several points of use or may recirculate it from the bottom to top of the silo. Recirculation is part of the set operational routine to keep the sugar from caking. The silo has a hopper-type bottom to permit complete removal of all sugar. It is equipped with an air-conditioning system, used to heat the air in the void space of the silo, to aid in keeping the sugar dry and free-flowing. Space has been provided and duct work installed to add a refrigerative dehumidifier if needed.

Greaseproof and Wet Strength a problem?

RHINELANDER

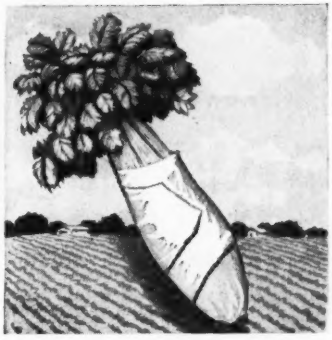
Has the Answer with.....



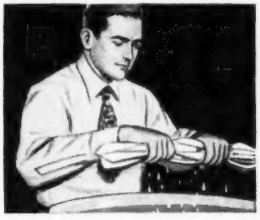


Wet strength, odor exclusion, moldability, and ease of handling all are factors desired in butter and oleo wraps. Aqua-Tuf offers all these plus low price. It's ideal, too, for many other dairy products.

Bulk ice cream benefits by the remarkable wet strength of Aqua-Tuf for liners and can covers. Makes for neater, better appearing packages . . . it's greaseproof, too, and ideal for ice cream bars.



Garden fresh . . . but will it stay that way? Aqua-Tuf will help maintain moisture . . . keep celery and other vegetables fresh and clean from farm to market. This requires wet-strength —and Aqua-Tuf's got it.



72 hours in boiling water and still it doesn't disintegrate—that's Aqua-Tuf —available in a wide range of glassine and greaseproof grades.

The beauty of Aqua-Tuf is that it makes available that very useful quality of wet strength along with the wide variety of paper characteristics offered by glassine and greaseproof papers—equaled nowhere in the paper world. Perhaps you have a packaging problem that requires moisture control, grease resistance, and wet-strength at a low price. We would like to tackle your problem. Why not let us know about it?

Write for free test samples today. Please state application.

RHINELANDER PAPER COMPANY
Rhinelander, Wisconsin

from solder manufacturing

to shortening!

"wide-awake process men value

DOWTHERM

the MODERN heat transfer medium

DOWTHERM® is efficient! DOWTHERM, with a high coefficient of heat transfer, speeds heating and minimizes equipment size.

DOWTHERM provides flexibility within the operating range. Heat supply to several units at different temperatures is possible, if desired. It also provides a high uniformity of heat control, preventing hot spots and local overheating of your product.

If your operations require precise heating in the 300-750° F. range, write to Dow for complete information about DOWTHERM.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

THE DOW CHEMICAL COMPANY
DEPT. DO 13, MIDLAND, MICHIGAN
Please send me "The Dowtherm Story."

Name _____ Title _____

Company _____

Address _____

City _____ State _____

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

The scroll conveyors and elevator have electrical power controls that are interlocked and will shut down the entire system if any unit in it is stalled by overloading or other trouble. Lights on the control panel indicate which units are operating.

All hoppers, scroll conveyors, and the elevators are equipped with pressure switches (Bin-Dicator units). And should sugar pile up in the elevator boot, carry over the end of scroll conveyors, or overfill the surge hoppers, these switches will kickout preceding units in the conveying system. Yet they permit the following units in the line to continue operation and carry away the built-up sugar. Lights on the control panel indicate which of these switches may be in operation.

All gates, which require frequent operation, are controlled from the central panel. They are motor-operated, and red or green lights on the panel show whether they are in open or closed position.

To deliver granulated sugar to the Tote-Bin station, truck loading, or rail car, an operator first sets the turret hopper to direct the flow into the proper chute, next sets on an instrument the amount desired in pounds. Then the scale delivers that much and shuts off the flow.

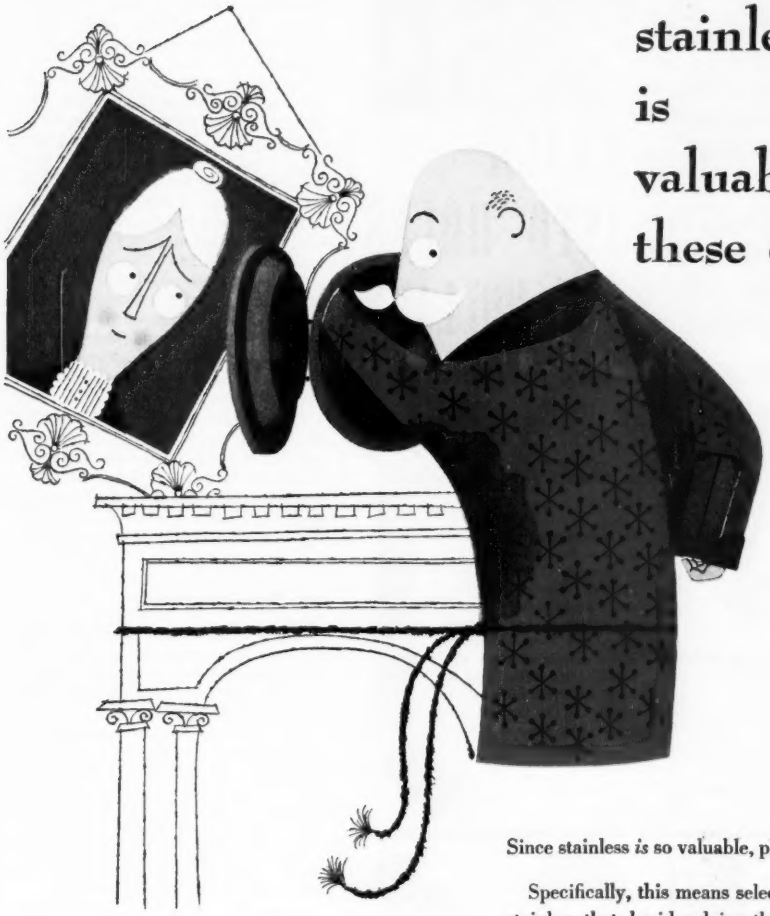
This Tasco (Amalgamated) flow-diversion unit, designed by company engineers, has an enclosed, revolving turret hopper with a single discharge spout. As many as four discharge spouts may lead from the base of it. Sugar enters through a single spout and may be routed manually, or by pushbutton from the control panel, to other points in the system.

The instrument controlling this scale has a limiting capacity of 20,000 lb., so it must be re-set when greater amounts are needed. For a rail car, it must be re-set five times to provide an increment of 100,000 lb. for the car load.

Tote-Bins of 1 or 2 tons capacity serve the industrial sugar user whose needs would not justify the cost of a storage bin and handling system required in bulk or liquid systems.

Bulk-Granulated Truck-Trailer

Tasco engineers were faced with the problem of devising rolling equipment in which both large and small quantities of bulk-granulated could be delivered efficiently and economically. Trucks of the dump type, which hydraulically tilt the entire truck-bin and discharge a full load of sugar to customer's systems (through a spout in the rear) were not acceptable for this purpose. Food manufacturers' needs in this area demanded more



stainless is valuable these days

Since stainless *is* so valuable, plan to make it go further.

Specifically, this means selecting a grade or finish of stainless that, besides doing the job adequately, will be in less demand than one you have been figuring on.

Here is where Crucible can help you out. The matchless experience of our metallurgists and stainless fabricating specialists can help you get the most out of your share of stainless.

Call upon us to help you.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

STAINLESS STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REZISTAL STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

Four times as many milk cans are scoured inside, at 20% lower brush cost, and the life of the cans prolonged — since one dairy had a special power brush built of Fullergript... the brush strip with brush material anchored in a metal channel.

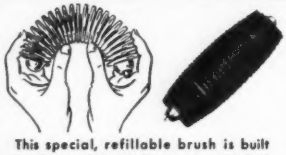
REACH INTO HOLES FOR DOLLARS

ROUND OR SQUARE TUBES, PIPE AND CHUTES CLEANED AT LOWER COST WITH *Fullergript*

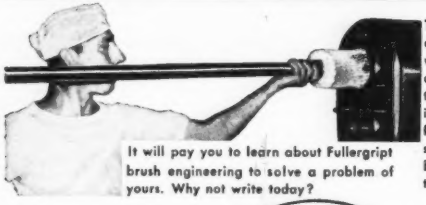
Brush life is doubled for dairies that clean tubes with this special Fullergript power brush, which can be reversed on the core for extra life. Another saving: only the coiled brush strip is replaced; the husky brass core is permanent.

For power plant operators these condensor tube cleaning brushes are built with coiled Fullergript strip. The type shown above at the right uses protective rubber bumpers which also serve as pistons when compressed air is applied to the tubes. For a lower cost brush many power plants use the type at the lower right, which is formed around a wood dowel.

This square brush rides the chain in a flour elevator leg, to reach into corners, and remove weevil-breeding flour accumulations. A good example of Fullergript design versatility.



This special, refillable brush is built flexible, to bring Fullergript's multiplied cleaning action inside of beer lines.



It will pay you to learn about Fullergript brush engineering to solve a problem of yours. Why not write today?

This special brush for the freezing cylinders of ice cream machines will last eighteen months (instead of one month) but more important, it assures positive removal of incipient casein deposits — in just five to ten strokes. Fullergript strip, with channel-anchored brush material, makes possible this augmented scouring action.

INDUSTRIAL Fuller BRUSH CO. DIVISION

3640 MAIN STREET HARTFORD 2, CONN.

Wet and Dry Mops, Brooms, Waxes and Polishes, Floor and Special Brushes

flexibility, because it was expected that smaller amounts than large dump-truck loads would be frequently ordered.

So the company designed and had constructed a trailer that, from the outside, appears to be a van-type with a sloping back. An air conveying system, which moves sugar from the truck into customer's storage tanks, is an integral part of this unit.

In addition to performing the special job of automatically delivering bulk-granulated to customer's in-plant storage, this unit has cut the cost of delivery in half, as compared with bagged sugar. Only one man, the truck driver, loads and unloads the unit. He can load it in 20 min. and unload it into the customer's storage in 35 min.

Still more savings not directly measurable in dollars and cents are realized by this unit in terms of better sanitation, complete protection from contamination and moisture when in transit, and elimination of spillage loss. Further, this means of delivery does not tie-up dock space.

Has Three Sections

The interior of the trailer is divided into three sections, comprising the power plant, a pair of 10,000-lb. bins, and the operating controls and gages for unloading sugar.

In the front section is a positive displacement air blower capable of developing up to 15 lb. pressure and able to supply 1,600 cu. ft. of air per minute to the 6-in. unloading duct. The blower is belt-driven by a 6-cylinder industrial gasoline engine. It is equipped with a combined air-filter and intake sound-muffler.

A suction relief valve, adjusted by spring tension, is set to open at 4 lb. pressure in the event the suction filter becomes plugged. Another pressure relief valve, located on the discharge side of the blower, is set at 6 lb. pressure to protect the customer's sugar piping.

The engine is started from a control panel and rpm. controlled here by a hydraulic, remote throttle. By tachometer and a throttle control on this panel the rate of unloading may be varied to accommodate different air back-pressures encountered in customers' in-plant systems.

A pressure equalizing line, running from the discharge side of the blower to the top of each bin, provides a pressure in the bins equal to that in the line beneath them so sugar will gravitate freely into the square discharge duct. This eliminates the need for rotary seal feeder valves, normally employed to assure no blow-back of air into the tank (by provid-

ing a negative pressure across the unloading valves).

The controls and gages on the other panel include a hydraulic and calibrated system with which the bin discharge gates may be exactly set.

Truck Loading

To load the truck the operator first sets the number of pounds desired for one bin. He then positions the turret hopper, in the elevator shaft, to deliver this sugar to the truck-loading station. Sugar, if chuted by gravity into these truck bins, would assume its normal angle of repose, thus leaving a void around the upper periphery of the bins.

To make it possible to load each bin to capacity, company engineers devised a bulk truck-loader. This unit is essentially an 8-in. cylindrical section on the top of which is a ½ hp., 420 rpm. gear motor that rotates the sugar-slinger at the outlet of the unit. It is connected to the fixed chute by a canvas stocking and has a hand-winch so it may be raised or lowered through ports into the truck bins.

When loading, the operator uses this sugar-loader only to fill completely the upper portion of the bins. When not in operation, sugar will flow freely through and around the perforated, vaned sugar-slinger.

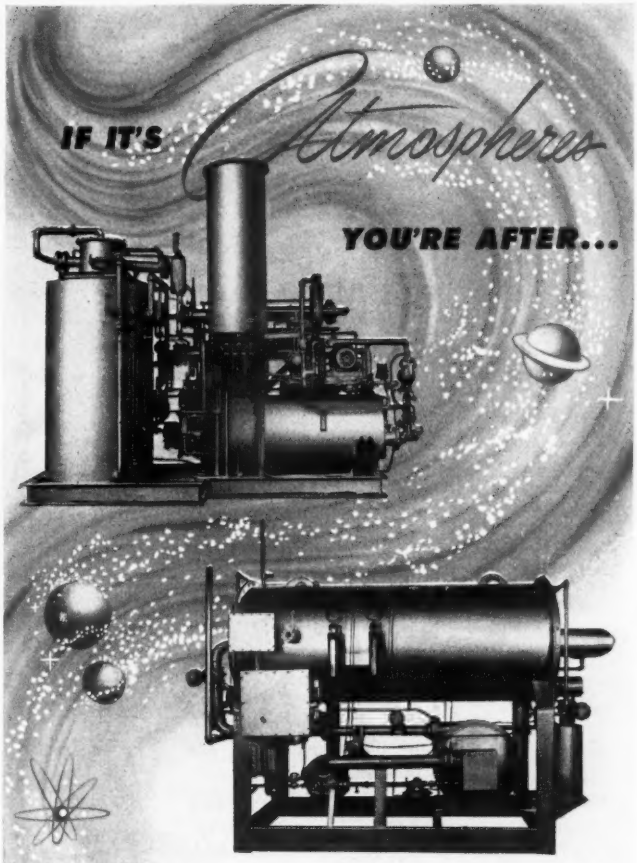
Unloading

To deliver granulated sugar to a customer's in-plant system, the trailer is backed into position and a flexible, 6-in.-dia, stainless steel hose is connected to the discharge duct and to the customer's receiving pipe.

All unloading operations are actuated by the truck driver at the two control panels in the rear section of the truck. He first starts the motor, then adjusts it to the desired rpm. by the tachometer with the remote, hydraulically operated throttle. The governor, on the carburetor of the engine, will maintain this rpm. regardless of the loading exerted on the air blower.

Using a velocity of between 7,000 and 8,000 fpm. and a loading of about 2 cu. ft. of air per pound of sugar, the product is pumped from the truck's bins into the customer's storage tank. These tanks are equipped with a cyclone type, primary collector (efficiency 99.8 percent) combined with a secondary collector (a cloth stocking) which gathers all sugar dust and discharges clean air.

Most in-plant systems are designed by Tasco engineers so that distances and heights the sugar must be air-conveyed will not be beyond the limits of this equipment.



Here are two great new generators that really do the work . . .

Gas Atmospheres has come up with two new atmosphere generators — a Nitrogen and an Inert — completely packaged units that are unsurpassed by anything in the field. **Compact** — these generators require less floor space per foot of gas than any generator made. **Foolproof** — they incorporate the latest approved safety devices . . . can be installed either inside or outside. **Production** — quality, uniform analysis atmospheres at constant out-put regardless of fluctuating supply gas. **Automatic** — push button control, easily accessible panel includes all controls.

Many other extras make these generators the finest available today. Before you buy generator equipment be sure to talk with a Gas Atmospheres engineer . . . it will pay off in the most efficient, inexpensive, trouble-free atmosphere production you've ever had.

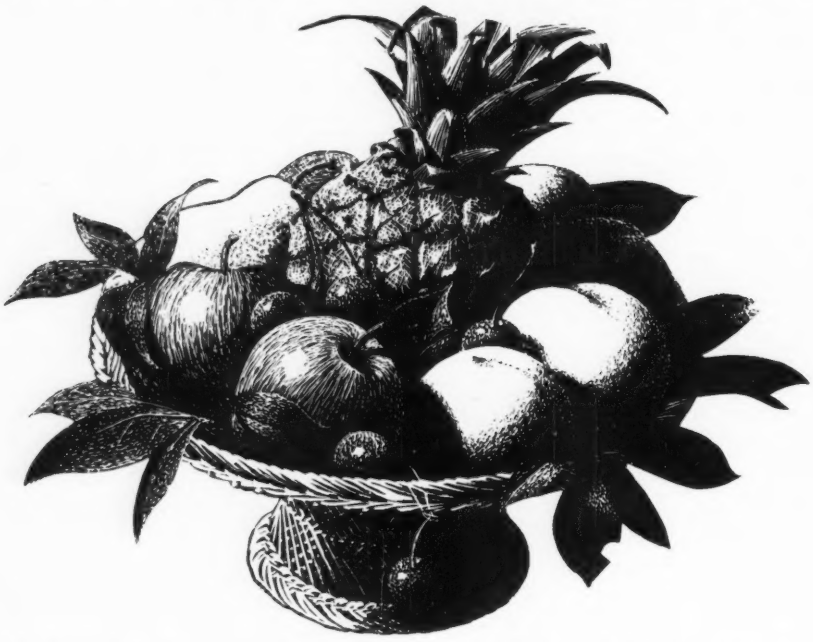
For more complete information write for Bulletin number I-552

gas Atmospheres, inc

equipment for producing industrial gases

20005 WEST LAKE ROAD CLEVELAND 16, OHIO

What can make these good foods better?



The foods shown here, like many others, are subject to oxidation during processing. Ascorbic acid will make them better by protecting them from the loss of natural color and flavor which oxidation causes. Small quantities of added ascorbic acid will greatly retard this action. When you use ascorbic acid in the easy, inexpensive Roche method to keep Nature's color and flavor in the foods you process, retail customers like them better and buy more.

We have helped many food processors to make their good foods better and we're ready to help you. Why not investigate the use of Roche ascorbic acid (vitamin C) today?

Quick Facts about Ascorbic Acid (vitamin C)

Roche ascorbic acid, as an anti-oxidant, protects natural color and flavor at low cost—
in frozen apples, apple sauce, apricots, sweet cherries, fruit cocktail,
nectarines, peaches, pears, pineapple, fresh prunes (Italian plums),
and frozen purees of peaches, bananas, apricots, nectarines and pears
in fresh fruit salads *in fluid, frozen and dried whole milk*

in frozen fillets of salmon, mackerel, rockfish,
white fish, lake trout and in frozen swordfish steaks *in ice cream*

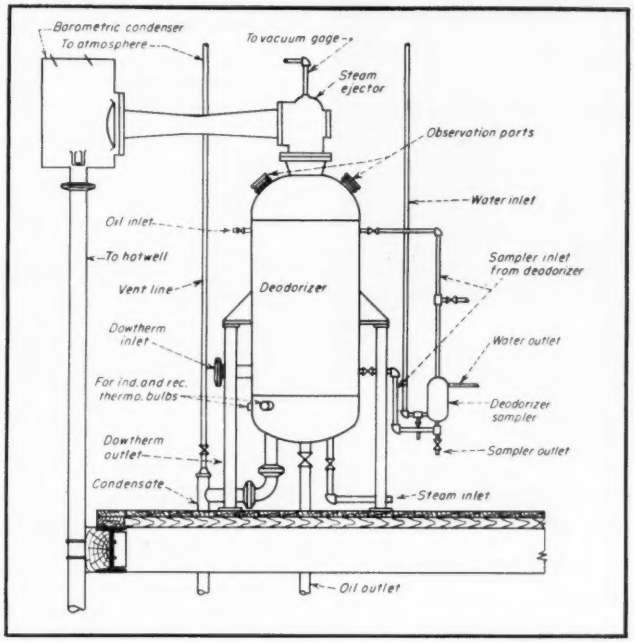
in packaged beer *in citrus oil emulsions.*

keeping faith with nature

ROCHE
ASCORBIC ACID

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, NEW JERSEY
Pacific Coast: L. H. Butcher Company, Los Angeles, San Francisco, Seattle, Portland, Salt Lake City
In Canada: Hoffmann-La Roche, Ltd. • Montreal, Que.

ADVANCES IN TECHNOLOGY



Newly Developed Pilot-Plant Batch Deodorizer Has Many Uses In Vegetable Oil Research

A batch deodorizer with a working capacity of 300-600 lb. has been built at SRRL. It can be operated at temperatures up to 450 F., vacuums as high as 29.7 in., and with various amounts and pressures of blowing steam.

By slight modifications the unit could be used for manufacture of mono-, di-, and tri-glycerides; various esters; drying oils and fats, and similar operations.

The unit (see illustration above) is 6 ft. 2 in. high by 30 in. inside dia. Shell is constructed of ⅜-in. mild steel. It is equipped with 2 sets of internal coils connected in parallel for Dowtherm heating and cooling, and a stainless steel ring drilled with 64 holes (⅛-in.) for introduction of blowing steam. Observation ports are located at top of vessel, and openings are provided for sampler connections, thermocouple, and dial thermometer.

To provide accurate measurement of amount of blowing steam, a flowmeter is installed close to the vessel. Inert gas could easily be introduced and measured here, too.

Heating is accomplished by circulating vapor from a Dowtherm boiler. Cooling is with liquid Dowtherm which then passes through an interchanger giving up heat to cooling water.

A 3-stage steam ejector and barometric condenser with hot well are used to produce vacuum. With the 2nd stage of the ejector cut off 29 in. of vacuum is easily obtained, and with the entire unit operating, 29.7.

Water from the barometric and intermediate condensers, and steam exhaust from the booster ejector discharge into the hot well, which is baffled for recovery of entrained materials such as oils and emulsions.

To enable the operator to take periodic samples, a water-jacketed sampler was constructed of 3-in. steel pipe with welded caps on each end. Water jacket was formed of 5-in. steel pipe. Short, ¼-in. nipples were welded to each end of the sampler and to top and bottom of jacket. A ¼-in. tee was placed in the line between the deodorizer and top of sampler, and 2 globe valves were installed, one close to the vessel, the other on the remaining opening of the tee to break the vacuum for withdrawal of a sample. A ¼-in. water line was found ample for cooling water.

Digest from "A Deodorizer For Pilot-Plant Studies," by W. A. Wellborn, H. J. Molaison, and E. L. D'Aquin, Southern Regional Research Laboratory, New Orleans 19, La.

Hexane Is Superior Solvent For Extracting Cottonseed

In a test of five commercial solvents for extraction of cottonseed, none of them compared favorably with hexane. Solvents tested were hexane (which was included as a control), benzene, ethyl ether, acetone, and butanone. Data were obtained for each solvent on yield, composition, and qualities of products, making batch extractions on pilot-plant scale unit.

Extractions were exhaustive, using about 3.3 gal. of solvent per lb. of flakes, moisture-free basis. Heated solvent was pumped through the flakes at a rate of about 30 gal. per hour until the predetermined quantity of 400 gal. had passed. Meals were desolventized by heat until no odor of solvent could be detected. Miscellas were concentrated under vacuum, sealed in glass containers, and stored in the dark.

Meal yields by extraction with the

INDEX TO ABSTRACTS

FATS & OILS
New Pilot-Plant Deodorizer.....171
Hexane Is Superior Solvent.....171
FISH & POULTRY
Rancidity in Herring.....172
Special Treatment of Shrimp.....172
Pasteurizing Liquid Egg.....173
DAIRY
Surface Active Agents Aid Butteroil Process.....173
Size of HTST Holding Tube Influences Efficiency.....174
FRUIT
Clarification of Apple Juice.....174
Transporting Fresh Fruit.....177
BEVERAGES
Carbonated Drink Powder.....178
Controlling Air in Beer.....178
MISCELLANEOUS
Curing of Tea.....180

. . Demand DARNELL
CASTERS & E-Z ROLL WHEELS

Always SWIVEL and ROLL

There is a type of Darnell Caster or Wheel for every kind of use and floor. Made for light, medium and heavy-duty service, you are sure to find in the Darnell line the exact caster or wheel to meet your individual requirements . . .

FREE MANUAL

Demand Darnell Dependability

DARNELL CORP., LTD.
DOWNEY, (Los Angeles County) CALIF.

60 Walker Street, New York 13, N.Y.
36 North Clinton, Chicago 6, Illinois

other four solvents were measurably lower then for hexane, but without detectable loss of nitrogen. Crude oil yields for all solvents exceeded the amount of oil determined in the original flakes, showing that all solvents extracted materials other than oil.

Hexane extracted relatively little non-oil material, and gave the smallest yield of crude oil. Butanone and ethyl ether gave the most complete oil extraction, but also extracted substantial amounts of non-oil materials.

Hexane-extracted crude was the only oil that refined to an acceptably low color. Acetone and butanone yielded the darkest crudes. Use of these two excellent solvents appears to depend on development of more effective means of decolorizing the oils.

Digest from "A Comparison of Five Commercial Solvents for Extraction of Cottonseed," by P. H. Eaves, L. J. Molaison, C. L. Black, A. J. Crovetto, and E. L. D'Aquin, *Journal of the American Oil Chemists' Society*, 88-94, March, 1952.

FISH & POULTRY

Rancidity In Herring

Ascorbic acid, ethyl gallate, gallic acid and pyrocatechol as fat antioxidants have been tested on British-caught herring, and on herring fillets, by incorporating the antioxdant in the water used for the ice glaze on freezing the fish or fillets.

While there was some inhibiting effect as measured by peroxide values of the fat, effects were variable from lot to lot and were not well defined. At best, they only retarded oxidation and in no case completely inhibited it. In flavor tests, made on thawed herring steamed one half hour in a casserole, all of the antioxidants had an adverse effect on flavor.

Digest from "The Development of Rancidity in Cold-Stored Herrings: The Influence of Some Antioxidants," by A. Banks, *Journal of the Science of Food and Agriculture*, Vol. 3, No. 6, 250-56, June, 1952.

Special Treatment Improves Shrimp

Flavor, appearance, and food content of cooked shrimp are said to be improved by a patented process of preparation.

According to the specifications, shrimp are first shelled and washed, after which they are successively immersed in a saline solution, a bath of water at about 180 F., and a cooling bath.

The saline solution is of relative high concentration—20 to 40 deg. salinometer. The cooking step lasts 3-8 min. followed by rapid cooling

and storage at 38-45 F. until consumed. The saline solution may contain spice or similar materials to lend flavor. Product is said to be tender and crisp in contrast to the tough and rubbery texture of shrimp cooked too long by conventional methods.

Digest from U. S. Patent 2,600,627, issued June 17, 1952, on an application dated Oct. 4, 1947, to Karl C. Envoldsen, Cleveland, Ohio.

Pasteurizing Liquid Egg

Salmonella type organisms may be completely eliminated from whole egg by heating to 140 F. and holding for a minimum of 3-min.

This was determined by a number of experiments conducted in an effort to develop a method of eliminating all *Salmonella* bacteria from whole egg without affecting the commercial usefulness of the frozen or dried products.

First tried was pasteurization of shell eggs with water or oil. In every case, it was found impossible to kill the bacteria without causing albumin to become opaque and jelled.

Then the raw egg was heated in a plate pasteurizer at temperatures ranging from 130-147 F. Temperatures above 140 necessitated too frequent shut-downs for cleaning.

Trials followed, in which liquid egg was flash-heated to 140 F. and held at this temperature for 30 sec., 2 min., and 3 min. The 30-sec. hold did not render the product free from *Salmonella*, and the 2-min. hold, although markedly reducing the contamination, did not eliminate it in all cases. The 3-min. hold was proven satisfactory during a 150-hr. continuous operation.

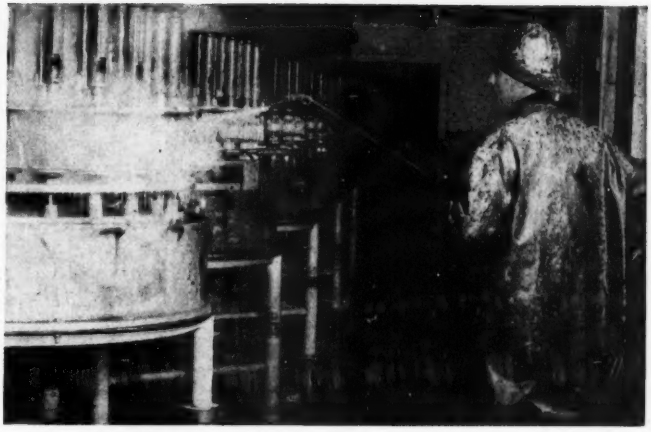
Digest from "Pasteurization of Liquid Whole Egg," by H. E. Goresline, *Marketing Activities*, (USDA Prod. & Marketing Adm., Washington 25, D. C.) 3-6, March, 1952.

DAIRY

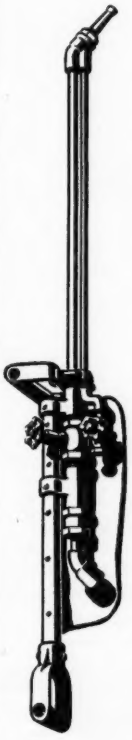
Surface Active Agents Aid Butteroil Process

An economical method of preparing butteroil by de-emulsification of cream with surface-active agents has been developed in the laboratory and tested in the pilot plant.

Method comprises addition of approximately 4 percent agent to 40-45 percent cream, heating to 180F. and holding with agitation for 15 min. Mixture is then allowed to lie quiescent for about 15 min. to separate serum layer from fat. Serum is syphoned off, replaced with an equal volume of hot water, the fat-water mixture agitated for 5 min. and centri-



Slash hours off cleaning time with this one-man crew



Here's the 481 Oakite Steam-Detergent Gun—the one-man crew that cleans up your entire plant *in half the usual time.*

No tedious scraping or scouring with this dirt-dynamiter. Just a twist of the valve and the gun fuses heat, force, powerful detergent to get under, lift off all bacteria-breeding deposits—no matter how heavy or how hard-to-reach.

Easy to operate, the Gun requires no motors, injectors, pumps. Just 30 lbs. of steam pressure, a couple of lengths of hose, and a solution container—and you've got the answer to your toughest cleaning problems. The Oakite Steam-Detergent Gun can't be beat for cleaning

- Packaging machines
- Blanchers
- Graders
- Elevators
- Conveyors
- Trimming tables
- Peelers
- Sorters
- Fillers
- Cookers
- Can sealers
- Walls, ceilings, floors

FREE Booklet 7709 tells all about Oakite Steam-Detergent Cleaning—other Oakite shortcuts to plant-wide sanitation. Write Oakite Products, Inc., 26G Rector St., New York 6, N. Y. No obligation, of course.

SPECIALIZED INDUSTRIAL CLEANING

OAKITE

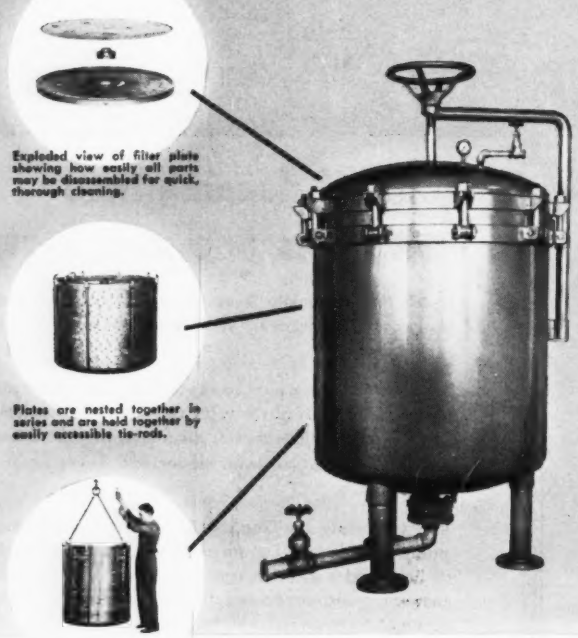
TRADE MARK REG. U. S. PAT. OFF.

MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of United States and Canada

For more information, use post card on last page.

....in food processing
Sparkler Filters
share your responsibility



Exploded view of filter plate showing how easily all parts may be disassembled for quick, thorough cleaning.

Plates are nested together in series and are held together by easily accessible tie-rods.

When cleaning is indicated the entire assembly can be removed from the filter tank to the most convenient cleaning station with minimum effort and labor.

When processing any type of food product, there are certain standards of purity and sanitation that must be met both in the public interest and in the interests of maintaining the manufacturer's reputation.

Sparkler filters *are* designed to help do that job . . . simply and positively.

The illustrations show why Sparkler filters are completely sanitary. They also show how the horizontal plate is used. It is this horizontal plate feature that assures unsurpassed quality and *constant* quality of filtrate. With a Sparkler filter on the job, the entire filtration process becomes one step in your operation that *you can count on.*

Write Mr. Eric Anderson for full information.

SPARKLER MANUFACTURING COMPANY

MUNDELEIN, ILLINOIS

Sparkler International Corp.
Herengracht 568, Amsterdam, Holland

Sparkler Western Hemisphere Corp.
Mundelein, Ill., U.S.A.

Manufacturers of fine filtration equipment for more than a quarter of a century.

fuged. Oil is rewashed twice with hot water and reseparated.

Refractive indices of butteroils made from the same cream by the above process and by churning techniques were identical. Sulfur analyses of the two products indicated no residual alkyl sulfate in the surface-active agent treated one.

Digest from "Preparation of Milk Fat. II. A New Method of Manufacturing Butteroil," by C. M. Stine, and S. Patton, *Journal of Dairy Science*, 655-60, Aug., 1952.

Size of HTST Holding Tube Influences Efficency

For a given rate of flow through the holding tube of HTST pasteurizer, highest efficiency can be obtained by constructing the tube of the smallest practical size.

Data have been obtained on efficiencies of holding tubes comprised of 1-, 1½-, 2½-, and 4-in. sanitary metal pipe, and 1-, 2-, and 3-in. Pyrex glass tubing in lengths from 3-75 ft. Tubes 10 ft. or less consisted of a single straight run, while longer ones had return bends between each 10-ft. run. All had uniform upward slopes of ¼-in./ft. toward the outlet end.

Efficiency increased rapidly with the Reynolds number, then more slowly, and, finally, became nearly constant at high numbers. At any number the efficiency decreased as the diameter of the pipe increased.

Glass and metal tubes gave comparable efficiencies. Neither differences in their surfaces nor in the type of elbows used had any apparent effect. Air leaks tended to increase the holding time.

Formulas for calculating efficiencies are given.

Digest from "The Efficiency of Holding Tubes Used In High-Temperature Short-Time Pasteurizers," by W. K. Jordan, R. F. Holland, and J. C. White, *Journal of Milk and Food Technology*, 155-57, July-Aug. 1952.

FRUIT

Clarification of Apple Juice

Pectinases of different origin contain glycosidases having different modes of action. Even pectinases from the same source (a pure culture of mold, for example) are not uniform with respect to glycosidase and may contain several such enzymes.

A pectinase from *Aspergillus niger* (Pektinex) has been found to contain 4 enzymes of which only one is active against the native pectin of apple juice. The apple-juice-active fraction has an optimum pH of 5.5, while the remaining glycosidases are

(Turn to page 177)

WANT A GLIMPSE OF THE FUTURE?

LOOK AHEAD in your business, too! Have you examined your transportation requirements in the light of today's . . . and *tomorrow's* operating condition?

White *Specialized Design* engineers into your trucks all the quality . . . all the weight-saving advantages . . . all the economy that comes from years of experience. From years of building to highest standards and efficiency, yet tailoring to your exact operating conditions.

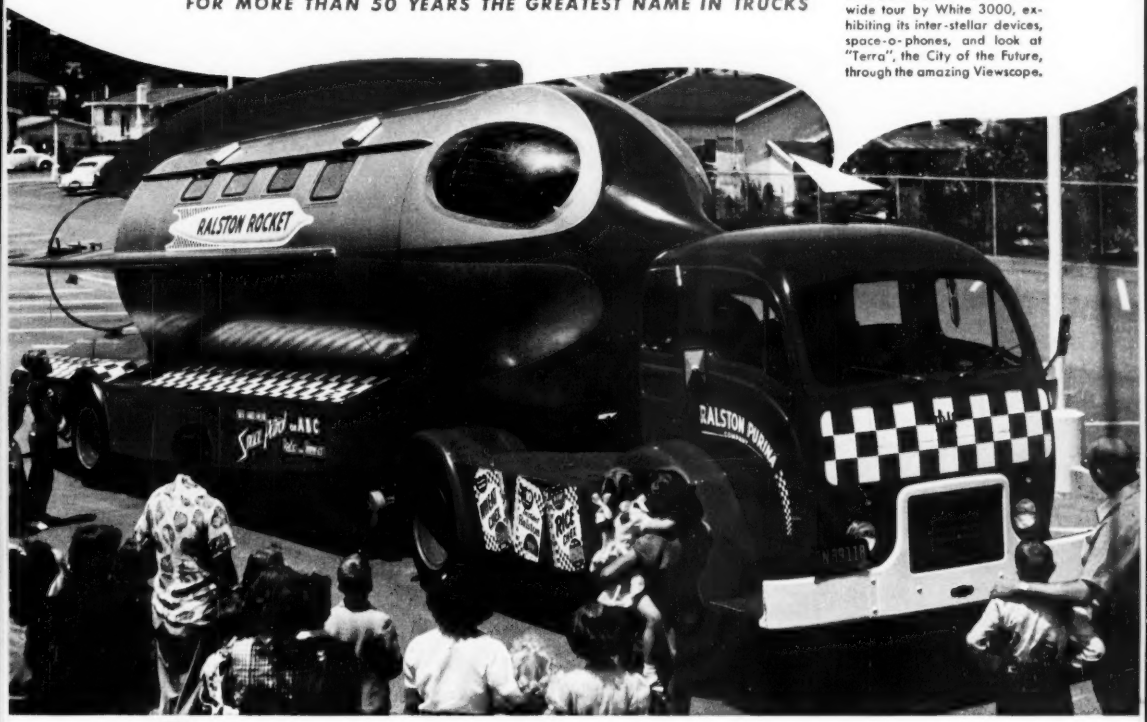
Ask your White Representative to evaluate your present transportation equipment . . . show you how substantial savings and extra revenue are possible . . . in your business, starting *today!*

THE WHITE MOTOR COMPANY • *Cleveland 1, Ohio*

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

TOMORROW'S TRUCK FOR RALSTON-PURINA CO.

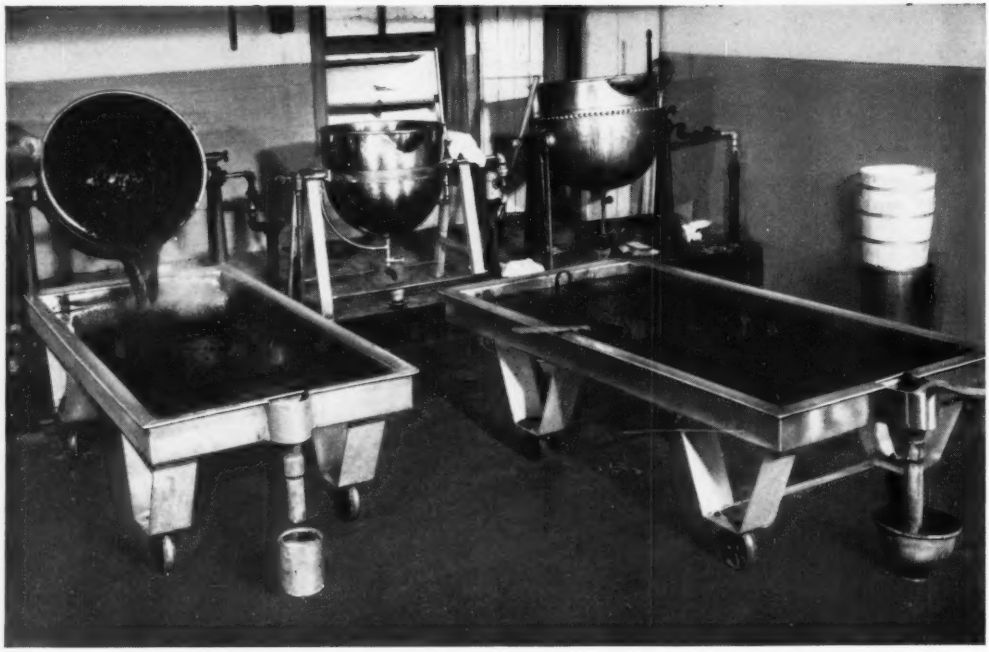
The most exciting White in the Ralston-Purina fleet is "Terra IV", the space ship of Commander Buzz Corry, "Space Patrol" hero. The Ralston Rocket is on a nation-wide tour by White 3000, exhibiting its inter-stellar devices, space-o-phones, and look at "Terra", the City of the Future, through the amazing Viewscope.



White
PAYLOAD PROCUREMENT PLAN

FIND OUT WHAT IT MEANS TO YOU

Your White Representative will be glad to give you facts about the White Payload Procurement Plan . . . your most practical approach to today's operating problems in highway transport. For extra earning power . . . new savings in operating costs . . . see your White Representative.



ENDURO HELPS BAKERY POCKET COOL SAVINGS

Here you see Republic ENDURO Stainless Steel in use in fruit cooling tables. That's just one ENDURO application in this eastern bakery which prompts management to report that: "It affords every advantage claimed for it. It results in savings in the long run. Upkeep has been nil, because this ENDURO equipment has never required any special maintenance."

That's the way it is with Republic ENDURO Stainless Steel. Wherever used, it rapidly becomes the standard by which all equipment is judged. ENDURO offers a remarkably long, profitable life. (This bakery equipment, for example, has been doing its job faithfully for a quarter-century!)

ENDURO does not contaminate metallically. It has no effect upon foods, is not affected by them. It resists rust and corrosion. It is easy to clean and to keep clean.

For your future new equipment and replacement programs, think ENDURO. Republic metallurgists will help you get the most value from the many available analyses. Write us:

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

See and Hear
"THE STORY OF STAINLESS"

Full-color, 16 mm sound film — 27 minutes running time. Dramatic . . . historic . . . interesting. Available to qualified groups without charge. Requires 16 mm sound projector. Send name of organization, type of projector, requested date to Ideal Pictures Corp., 65 E So. Water St., Chicago 1, Ill., or write Republic Steel, Dept. K, Cleveland 1, Ohio.

Republic
REPUBLIC STEEL
ENDURO® STAINLESS STEEL

Other Republic Products include Ex-L-ite Tin Plate, Pipe, Sheets, Bolts and Nuts, Electrunite Tubing, Niles Barrels and Drums

optimum in activity at 3.5. The active fraction can be separated by adsorption on fullers' earth at pH 3.5, while the remaining enzymes are separated at 12 and 86 F.

Effect of each fraction on apple juice clarification was tested. The esterases were found to exert no positive influence on liquefaction of the native pectin. Activity of pectinase on apple juice is best evaluated by comparing it with a standard pectinase preparation rather than by allowing it to act on a standard pectin solution.

Digest from "The Effect of Pectinase on Apple Juice and Pectin Solutions," by E. Schubert, *Schweizer Brauerei-Rundschau*, Vol. 63, No. 6. 95-101. June, 1952.

Transporting Fresh Fruit

Successful marine transportation of fresh fruit depends on conformity to the biological peculiarities of the fruit as well as on sound refrigeration engineering in the holds.

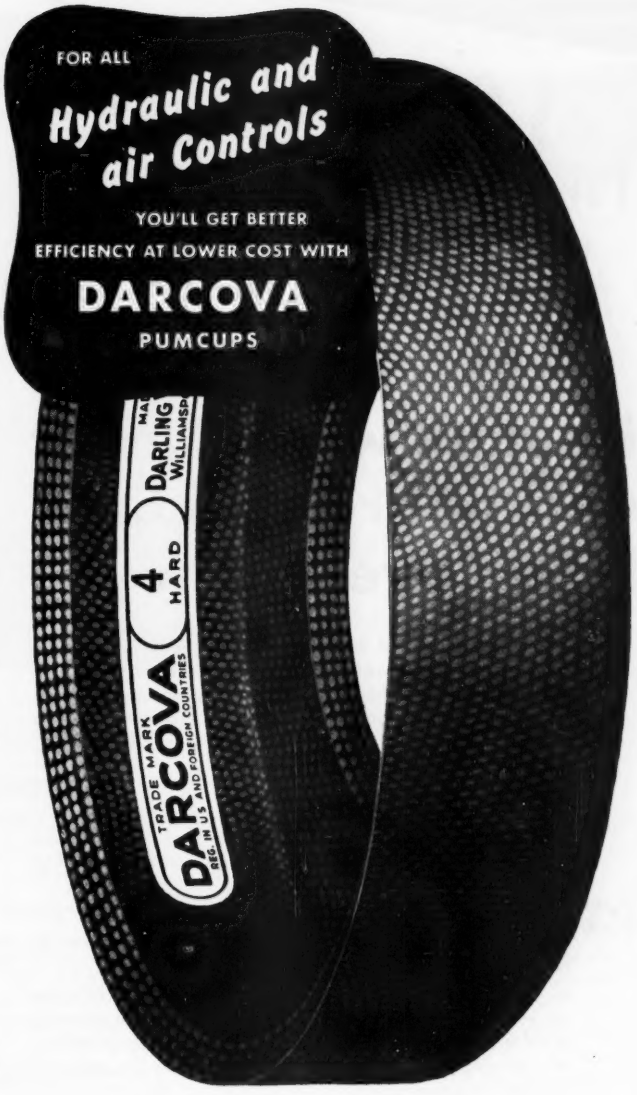
Pears and some varieties of apples will withstand storage at 32 F. Pears that will ripen after 8-9 weeks of such storage will be better for ocean shipping than those that suffer internal damage after such exposure.

Bananas are not tolerant to low temperatures. The chief commercial variety, Gros Michel, is damaged at temperatures below 53 F. for more than a few hours, and a 15 day storage at that temperature is about the limit that the fruit will stand. Because of the spread of panama disease the Gros Michel is being replaced to some extent by the Lacatan, a variety which is rapidly injured by temperatures below 58 F. Obviously ocean shipments of the two varieties must be segregated from each other, or there will be a risk of "ship-ripe" fruit if Gros Michel is included in the shipment.

Fruits such as citrus that are easily attacked by fungi must be shipped at temperatures high enough to keep physiological breakdown to a minimum, and low enough to inhibit mold growth. Sometimes the risk of low temperature injury must be taken to avoid heavy losses from rotting.

Some fruits have a critical temperature for low temperature injury. South African plums, for example, spoil rapidly at 37 F. but are retarded at 32 or 45 F. At the higher temperature, however, rotting may be excessive. The fruit is therefore cooled rapidly to 32 F., and then raised to 45 F. during the voyage. The quality of the fruit landed in England has been greatly improved by this method of storage during shipment.

Accumulation of CO_2 in holds be-



There's a free bulletin full of reasons and proof. Ask for it today!

DARLING VALVE & MANUFACTURING CO.
WILLIAMSPORT 20, PA.

DARCOVA
THE ORIGINAL COMPOSITION CUP

PUMCUPS

For more information, use post card on last page.

For LONG RANGE EFFICIENCY

insulate with Mundet Corkboard and Cork Pipe Covering...

Profitable production of frozen foods depends upon most efficient control of low temperature for freezers, hardening rooms, refrigerated storage and low temperature pipe lines. For long range economy and top efficiency, be sure you have MUNDET CORKBOARD for floors, walls, ceilings; MUNDET CORK PIPE COVERING for cold lines.

It pays to remember these benefits:

1. CORK IS MONEY-SAVING! Millions of dead-air cells in every square inch of Cork insulation cause it to serve as a most efficient *natural* barrier to heat flow. By its use, refrigeration is conserved to the most practical limits.

2. CORK IS LONG-LASTING! Cork has high structural strength and is a most durable material. It continues to serve for many years at highest efficiency.

3. THROUGH MORE THAN 80 YEARS AS CORK SPECIALISTS, we are able to preserve Corks' natural advantages in Mundet insulating products. Mundet engineers give you responsible assistance in building or expanding plant facilities. Let us help you secure low operating cost and maximum service.

Mundet Cork Corporation

Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

Mundet district offices are located in these cities:

ATLANTA 329-41 Elizabeth St., N.E.
BALTIMORE 30 612 Battery Ave.
BOSTON 57 Regent St., S. Cambridge 40
CHARLOTTE 6, N. C. 2301 N. Davidson St.
CHICAGO 35 E. Wacker Drive
CINCINNATI 427 West 4th St.
DALLAS 10 601 Second Ave.
DETROIT 21 14401 Prairie Ave.
HOUSTON 3 Commerce and Palmer Sts.
INDIANAPOLIS 56 E. Merrill St.
JACKSONVILLE 6, FLA. 800 E. Bay St.
KANSAS CITY 7, MO. 1700 Brooklyn Ave.
KNOXVILLE 1221 Grand Ave.
LOS ANGELES (Maywood) 6116 Walker Ave.
NEW ORLEANS 16 315-25 N. Front St.
NEW YORK 17 331 Madison Ave.
PHILADELPHIA 39 856 N. 48th St.
ST. LOUIS 9 3176 Bronson Ave.
SAN FRANCISCO 7 440 Bronson St.
WASHINGTON, D. C. 600 F Street, N.W.

In Canada: Mundet Cork & Insulation, Ltd., 35 Booth Ave., Toronto

INSULATION FOR HIGH & LOW TEMPERATURE

cause of the respiration of fruit can result in serious injury to it. The gas level should be kept below 5-6 percent, though a few fruits can withstand higher concentrations. Fruits, such as tomatoes, that emit ethylene, or over ripe fruits in general, should be kept away from fruits such as bananas that are highly susceptible to the ripening influence of ethylene.

Digest from "Refrigerated Marine Transport of Fresh Fruits," by J. C. Fidler, *Chemistry and Industry*, 531-33, June 14, 1952.

BEVERAGES

Carbonated Drink Powder

Beverage powders that, when mixed with water, produce highly palatable drinks in which the effervescence is maintained throughout the time they are consumed, are made by a process for which a patent has been granted.

According to the invention, 3 separate complexes—acid-, carbonate-, flavor-disaccharides — are prepared, then mixed in proper proportions to produce desired sweetness, flavor, and acidity in the final drink. Each complex is uniformly colored with a food dye.

The acid-disaccharide complex is made by mixing citric acid crystals with dyed sucrose and heating to about 175 F. (Other organic acids may be used.) The carbonate-disaccharide complex is made by heating a $NaHCO_3$-dyed sucrose mixture to about 165 F. for 30 min. Flavor-sugar concentrates are made by placing a mixture of the two ingredients in a sealed container for 24 hr. to insure thorough permeation of flavor in dyed sugar.

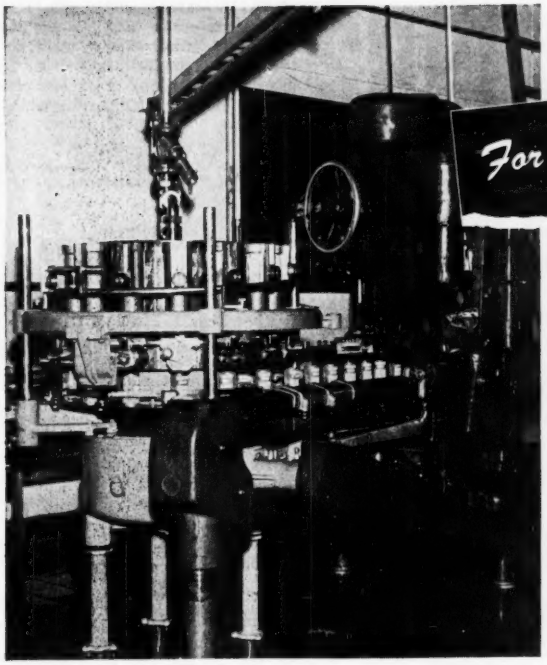
Digest from U. S. Patent 2,603,569, issued July 15, 1952, on an application dated Jan. 23, 1950, to I. G. Ather, Evanston, and P. M. Van Arsdell, Chicago, Ill.

Controlling Air In Beer

Air cannot be completely eliminated from bottled beer and the reducing substances in the beer react with it during storage. Natural reducing substances, melanoidins and reductones, can be augmented by the addition of artificial reductones (made by heating carbohydrates with alkalies), sulfites, hypophosphites, formates, or ascorbic acid.

Sulfur dioxide acts very slowly in beer and both oxygen and SO_2 will be found present after storage. The SO_2 also seriously affects the flavor when present at levels greater than 25 ppm.

Ascorbic acid, at the rate of 1.64 g. per bbl. is a very effective antioxidant. Nordihydroguiaretic acid



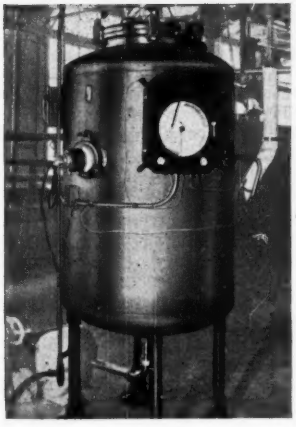
For your next citrus pack . . .

FAST PROCESSING AT LOW COST with Pfaudler Equipment

With the competition in citrus packing so keen, you will want to take advantage of these money-saving features of Pfaudler equipment.

Many packers of frozen and concentrated citrus juices have solved their oxidation problem with Pfaudler deaerators in combination with Pfaudler High-Speed Rotary Piston Fillers. To assure top quality and flavor, the deaerator removes all air just before the product is canned. With a constant vacuum maintained throughout the unit, the product is quickly, cleanly and accurately packaged by the Pfaudler Filler.

In addition, Pfaudler engineers are prepared to help you set up an efficient, economical vacuum processing unit. Use the coupon to get all the facts.



PFAUDLER ROTARY PISTON FILLERS are specially built for accurate, high-speed operation—100 to 600 containers per minute, depending on the product. An instantaneous volume adjustment controls fill within 1/10 of an ounce. Will handle containers up to 5 qt. size. The Vacuum Foods installation shown here is used for filling "Minute Maid" frozen orange juice.

PFAUDLER STAINLESS STEEL DEAERATORS can handle from 2 to 45 gallons of fruit juice per minute. To prevent flooding, an automatic liquid level control is provided. This is balanced with a vacuum differential controller. The unit shown is used by Nedicks for preventing oxidation in their famous orange drink.

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Deaerators
Piston Fillers · Vacuum Pans
Steam Peelers · Evaporators

THE PFAUDLER CO., Dept.FE-10, Rochester 3, N.Y.

Please send me full details on:

☐ Pfaudler Deaerators
☐ Pfaudler Piston Rotary Fillers

Name_____

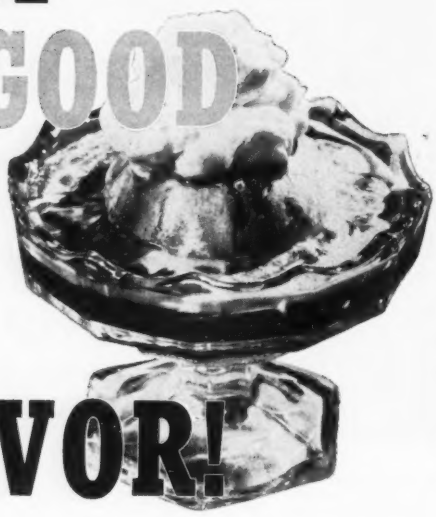
Company_____

Title_____

Address_____

City_____ Zone____ State_____

IT'S ONLY AS GOOD AS ITS FLAVOR!



WE MAKE FLAVORS for every product and for every purpose—each expressly developed for individual application or use. Thus, when the need is for sherbet, ice cream or topping,—or for that matter, any food or beverage product requiring added flavor—we have the pre-tested, proven, dependable flavor selection to offer. To this simple practice of fashioning the flavor precisely to the task it must perform, we attach large credit for the success-supported reputation for satisfaction that our products now enjoy. So, for your product's good, go FRITZSCHE . . . *A FIRST NAME IN FLAVORS SINCE 1871.*

Write us for Catalog C

FRITZSCHE *Established* 1871 *Brothers, Inc.*

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, Cleveland, Ohio, *Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, *St. Louis, Missouri, *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N. J.

(NDGA) has no appreciable antioxidant effect on beer. Actual air determination in bottles or use of the Indicator Time Test or one of its modifications should be used for controlling the air content of the bottled product.

Digest from "Practical Control of Air in Beer," by R. M. Thomson, in *Brewers' Guild Journal*, Vol. 38, No. 451, pp. 167-84, May, 1952.

MISCELLANEOUS

Curing of Tea

Tea "fermentation" does not require the intervention of bacteria or other microorganisms, though their presence may modify the final result. It is essentially an oxidation of polyphenols catalyzed by enzymes of the tea leaf. The enzyme involved is a polyphenol oxidase of the copper-protein type.

The withered tea leaves, about 18 hr. after picking, are rolled or twisted by large mechanical rollers. In about 2 hr. the fermentation is completed and the tea is then "fired" or dried to stop the enzyme action.

It is believed that the twisting of the limp leaves ruptures the membranes between the vacuoles containing the polyphenols (catechins and gallocatechins) and the cytoplasm which carries the enzymes, permitting contact of the enzyme and its substrate.

Amino acids and lipides are unaffected by the fermentation, and the chemical changes seem to be limited to polyphenol oxidation and condensation, though there is some evidence for changes in the pectin and essential oils of the leaves.

Digest from "The Chemistry of Tea Fermentation," by E. A. H. Roberts, *Journal of the Science of Food and Agriculture*, 193-98, May 1952.

—*End*—

Zero-Storage Economies

—*Continued from page* 103

of two standby generators driven by 12-cyl., 450-hp. diesels. These units are capable of furnishing 593 kw. of 3-phase, 60-cycle, 220/440-v. power for operating the refrigeration plant on a "business as usual" basis in the event of an extended power failure.

The warehouse is completely sprinklered for protection from fire with a dry-pipe system. Water is held in reserve in a 250,000-gal. concrete sump which doubles as a spray pond for diesel cooling water.

From an operational viewpoint, many records have toppled in regard to volume handling of citrus concen-

trate. For example, during one 24-hr. period early this year, 83,000 cases were handled with only three fork-lift trucks. This amounted to about two million pounds of product.

Normally there are ten men on duty during the morning and afternoon shifts (when loading and unloading), and only four on the midnight turn (receiving only). Storage temperature averaged —7 deg. F. during the first year of operation.

Judging from the past year's operation, the layout of the warehouse might be improved by a few seemingly minor, but important, modifications.

Connecting doors between the four rooms were omitted to provide maximum fire protection. But the insurance company now feels that regulation fire doors would be okay. So the obvious flexibility advantages of interroom connections could have been built in.

The warehouse-encompassing loading platform was constructed to a standard 16-ft. width, but practice indicates that a few extra feet would have added considerable working area as well as cut some of the loading accident hazards. Also, the canopies that now cover the platform only at the corners could very well have been extended completely around building. *End* *(Resume reading on page 103)*

Apples for Top-Quality Pies

—Continued from page 116

break-down early during baking. As a result, the fruit boils out, pies stick to the plates, and the oven deck becomes soiled.

Grading of the apples before baking is in order. The firmer ones will tolerate longer baking and there will be no difficulties. Obviously, it is also wise to grade the apples prior to storage. As stated, less boiling-out will occur with the firm apples, which will keep longer in storage.

Of appreciable significance from a flavor and sweetness angle is the use of apples of reasonably similar maturity. Within one lot, a difference of 2 percent, or more, of sugar may be found between under- and firm-ripe apples. Since the acid content significantly decreases as the fruit matures, the sweetness of the apples is more than proportional to the actual sugar content. Thus, less sugar is required when using the riper fruit, and there is a corresponding reduction in ingredient cost.

Depending upon variety and seasonal conditions, the lower limit of firmness is 9-10 lb. on the tester. This range represents a satisfactory balance

speed up— dress up—

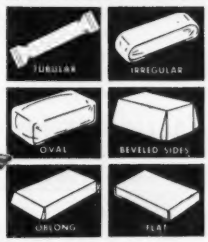
YOUR PACKAGING FOR IMPULSE SALES

PRODUCE EYE-APPEALING PACKAGES AT AMAZING SPEED OF 3 UNITS PER SECOND!

Yes — and numerous special installations are running as high as 300 per minute! Machine wraps single or multiple item units in neat, square cornered packages that *stimulate product interest — prompt buying action.* You cut packaging costs, too, with reductions in labor and materials. Most installations require only one person for both feeding and operating machine. Unless specially desired or actually needed, products are beautifully wrapped *without* boards or stiffeners. "Float" wrapping is the answer. Any type wrapping material may be used — with preprinted labels accurately positioned. Likewise, any type of automatic feed and wrapper sealing can be employed—including hermetical sealing. If you want *speed* and *improvement* in your packaging, investigate the Campbell Wrapper today!

Wraps—

FROZEN FOODS • SOAPS PREPACKAGED MEATS CRACKERS, COOKIES AND BAKERY GOODS • FOOD PRODUCTS • CANDIES • CONFECTIONS • FRUITS • PAPER PRODUCTS • ICE CREAM NOVELTIES • FILM MEDICINE DROPPERS CIGARS • BANDAGES PHARMACEUTICALS DRUGS • MACHINE PARTS AND 101 MISCELLANEOUS PRODUCTS.



New York office 55 West 42nd St.

We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments. Civilian orders are filled on a reasonable time basis only.

Campbell WRAPPER

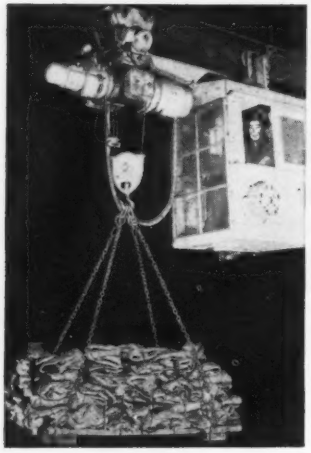
Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Crepers and Tissue Converting Units.

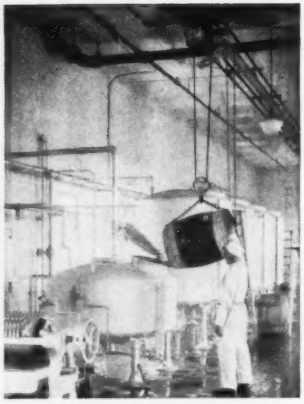
Write for fully illustrated brochure.

which one is right for your job?

FLOOR-OPERATED HOIST

Operator mainly occupied with other duties.





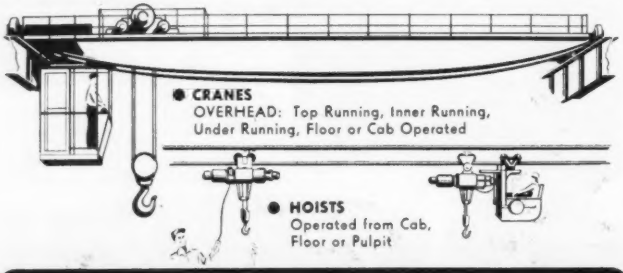
CAB-OPERATED HOIST

Operator in cab moves loads along at high speeds—occupies best vantage point for spotting or stacking.

Choosing the hoist that's right for your job calls for expert advice.

Let the Shepard Niles representative in your area guide you in your choice. He specializes in through-the-air handling — can help you select the hoist that fits your job. Write Shepard Niles today for Bulletins 127 and 177 — and ask to have a representative call.

Specialists in loads through-the-air since 1903


● CRANES
OVERHEAD: Top Running, Inner Running, Under Running, Floor or Cab Operated
● HOISTS
Operated from Cab, Floor or Pulpit

SHEPARD NILES
CRANE AND HOIST CORPORATION

1221 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

between maturity and economical handling. As pointed out, below 9 lb. pressure, apples will break apart in the paring machines and boil out during baking. One exception is the York apple, which should be used before the pressure drops to 13 lb.

Another economy factor to consider in handling apples is size. Yield of sliced apples per 100 lb. of whole fruit increases appreciably with the larger sizes. At the same time, labor costs decrease.

Apples usually used for pies are in the 2¼- 3¼-in. range. Sizes purchased will depend upon cost, with the larger sizes commanding a premium. Table III shows some interesting comparisons between sizes and yields. The figures in the fifth and sixth columns are the author's.

As against 3¼-in. fruit, over four times as many 2¼-in. apples must be handled and peeled for a given weight of sliced product. And about twice as many must be handled to equal yield of fruit in the 2½- 2¾-in. range.

Since each apple must be placed in the cup of the paring machine, it is obvious that more labor is required for the smaller ones.

Another labor-saving factor to be considered is the shape of the fruit. Here, irregularities will require additional hand trimming of the peeled and cored fruit, thus neutralizing any cost benefits that might otherwise be obtained.

The type and cut-setting of peeling and slicing machines will also influence the final yield. Setting of the mechanical paring knives is usually made for a limited apple-size range. When apples are not within this range, then yields are somewhat reduced.

Also, frequent attention to the sharpness and adjustment of these knives is necessary to minimize peeling losses. If periodic checks on the performance of these knives are not made, peeling losses may even double.

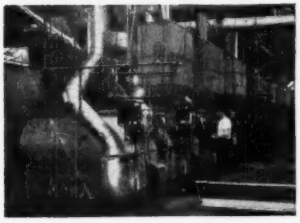
Important, too, is the diameter of the coring knife. To eliminate seed cells from larger apples, a ¾-in.-dia. coring knife should be used without the seed-celling devices. The ½-in.-dia. knife can be used with the seed-celler on smaller fruit.

References

1. Smock, R. M., and Neubert, A. M., *Apples and Apple Products.* Interscience Publishers, Inc., N. Y. C.
2. Allen, F. W., *Apple Growing in California.* Univ. of Calif. Agri. Expt. Sta. Bull. 425. Rev., May, 1937.
3. Haller, M. H., Lutz, J. M., and Mallison, E. D., *The Relationship of Firmness to Ripeness of Eastern-Grown Apples.* U. S. Dept. Agri. Circ. 579, Jan., 1941.
4. Bisno, L., "Stored Apples — Why They're Lost and How They're Saved." *Food Ind.*, Jan., Feb., and Mar., 1950.
5. Bigelow, Gore, and Howard, U. S. Dept. Agr. Bur. Chem. Bull. 94, 1905.

End (Resume reading on page 116)

VOLUME food processing WITH GAS

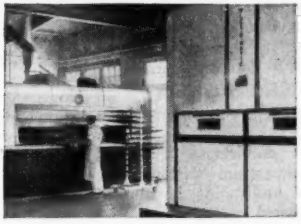


COFFEE ROASTING

Fast, uniform roasting is assured with this battery of 9 Gas-fired batch roasters, which has an annual output of 25,000,000 pounds. Gas does this job uniformly, economically and dependably.

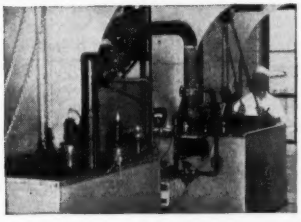
MEAT CURING

Gas burners char Hickory sawdust in this 3-story smoke house to generate aromatic smoke for curing and smoking of hams. Gas is the ideal fuel for food processing because Gas is clean, efficient, and affords precise temperature control.



VARIETY BAKING

Versatility of Gas and Modern Gas Equipment is evident in volume variety baking of rolls, breads, cakes, pies, etc. Precise, automatic temperature control for perfect baked goods is available with dependable Gas.



FOOD SPECIALTIES

These immersion tank units used for blanching nuts are typical of the Modern Gas Equipment available for special food processing. Wherever heat is needed to process foodstuffs, you will find that Gas is the dependable, clean, economical fuel to use. Get the facts about GAS today, from your Gas Company Representative.

MORE AND MORE THE TREND IS TO GAS FOR HEAT PROCESSING OF FOODS

AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVE., NEW YORK 17, N.Y.

What type of
CUSTOM BUILT
WIRE CLOTH
PARTS
do you need

heat treating?

straining?

screening?

filtering?

handling?

You can be sure of getting exactly what you need in custom built wire cloth parts when you call—

Cambridge

With more than 30 years experience in this field, we can work from your own prints . . . or, if none are available our design engineers will draw up prints based on your description of the job the part must do.

Our newly expanded production facilities include equipment for cutting, forming, bending, shaping and welding of any metal or alloy in sheet, rod, or wire cloth form . . . as well as our large battery of wire cloth looms.

Tell us your needs. Let us tell you how economically and quickly we can fill them. Write direct or call your Cambridge field engineer. Look under "Baskets-Wire" in your classified telephone directory.

FREE CATALOG describes Cambridge facilities for fabricating metal specialties. Write for your copy today.

The Cambridge Wire Cloth Co.

Dept. Q • Cambridge 10, Md.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Questions & Answers

THIS MONTH'S PROBLEM

Question—We have an annual problem at the start of each tomato season. After the first day's run on tomato catsup, part of the pack must be set aside because of the objectionable metallic flavor pick-up from the lines. Our cooking kettles and holding tanks are of stainless steel. But from here on, there are brass filler bowls and copper pipes and fixtures. In the past, we have tried to eliminate this condition by running hot caustic, water, or vinegar through the system. We even allowed the vinegar to stand overnight. However, the end result is invariably the same—the tomato product does the metal cleaning. Consequently, we must discard some of our product each season. The reaction for corrosion is: $2Cu + O_2 + H_2O$ yields $Cu_2CO_3(OH)_2$. Now, should we remove this product of corrosion? Or should this problem be attacked from another angle?

Answer to August Problem

The Question Was—We employ a unit for continuously pasteurizing bottled beer. Employing a "walking beam" conveyor, this machine automatically preheats, pasteurizes, and cools the beer. Heating and cooling are accomplished by water sprays delivered through a recirculating system. However, we are up against a problem that we've been unable to lick—recording the temperature of individual bottles of beer traveling through. Temperature recorders in different zones of the unit do not, of course, measure the temperature inside the bottles. Can you suggest a possible solution?

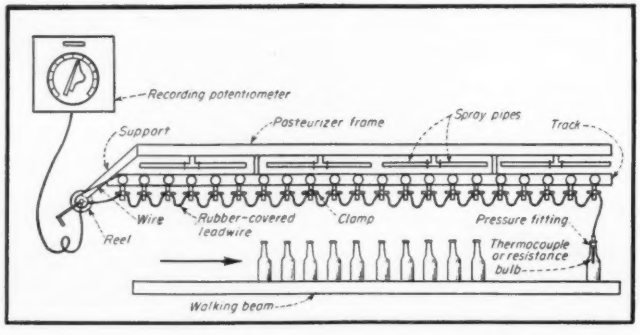
Answer—Your problem of determining the temperature within a sealed container undergoing heating and cooling is shared by the canning and preserving firms. To the best of our knowledge, a record of the temperature of product in each container would entail an unbearable expense. Fortunatcly, such detailed records are not essential for commercial operations, provided a certain amount of data is accumulated and correlated.

To obtain such data, it is necessary to seal a small temperature-sensing element within the bottle and connect it to an external recording instrument. The bottle can then be rigged up to travel through the pasteurizer under conditions simulating, as near as possible, commercial operations. During its travel through the unit, progress of heating and cooling can be followed by the instrument.

Simultaneous reading of the different zone-temperature recorders, together with pertinent observations on treatment time, product load on the pasteurizer, flow rates, heating and cooling media, and other data, will permit you to determine processing conditions. In this way, you will know the desired time-temperature relationships within the bottle.

Of course, the temperature-sensing element should be suitable for the temperature range to be encountered and it should be designed to respond promptly to temperature changes. A fine-wire thermocouple or resistance thermometer may meet these requirements. In either case, temperature changes inside the bottle will create a minute electric-current flow. And, with suitable lead wires, this current can be measured by a sensitive electrical recorder conveniently fixed to the outside of the pasteurizer.

However, we suggest that you consult a manufacturer of instruments on specification details. If it is not possible to purchase a calibrated meter, it should not be difficult to establish a few reference-temperature readings so you can do your own calibration.



Handling the long lead wire will be a problem. It is suggested that you support them and use a reel to keep them out of the walking-beam gratings. If the instrument could be located at the center of the pasteurizer, shorter leads could be employed.

Another problem will be sealing the sensing element into the bottle, which will be under pressure. You may have to devise a special fitting for this purpose.

A suggested hook-up (see diagram) consists of an overhead monorail, suspended along the entire length of the pasteurizer. If the spray pipes run tranversely, this rail must then be suspended below the pipes. If possible, the rail can be clamped to the spray pipes.

Sufficient rubber-covered lead wire should be connected to the thermocouple, so that it will run several feet beyond the length of the pasteurizer. About every 3 or 4 ft., clamp the lead wire to a rider-wheel, which travels along the suspended track. The last wheel should have enough lead wire between it and the thermocouple, so that the wire can "pay out" the width of the pasteurizer.

Attach a reel to the feed-end of the pasteurizer. Also, extend the track to permit all riders to be reeled back, so that they will clear the entrance of the pasteurizer. In this manner, a new bottle can be easily hooked up. Then the bottle can be fed onto the walking beam. In traveling through the pasteurizer, the line is "played out" until it reaches the discharge end of the unit. The 'couple can then be disconnected, reeled back, and hooked up to another bottle.

This system should provide a continuous, highly accurate temperature curve (within ¼ deg. F.). Thus, in-bottle beer temperature during the pasteurizing cycle will be recorded on a strip chart.—*The Editors*

Still Another Answer

Recording the temperature of a bottle of beer as it proceeds through a continuous cooler is easily accomplished with a special temperature recorder. The instrument's recording mechanism is housed in a waterproof case, with the sensing element attached to a rigid tube so that it can be inserted in the beer bottle. Clamps on the back of the instrument case secure the bottle. The recorder and bottle of beer then proceed through the pasteurizer.

Temperatures in the pasteurizer can also be obtained by running the recording instrument through the unit without the bottle of beer attached to it.—*I. J. Plug, Assistant Professor, School of Engineering, Univ. of Mass.*

WESTON TAG Thermometers

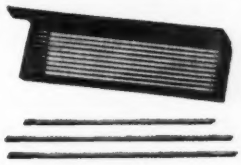
in all forms—ranges—stem lengths—connections

Whether your requirement calls for certified laboratory thermometers . . . or rugged all-metal industrial types . . . or thermometers for remote reading . . . you'll find *exactly* what you require in the Weston-TAG line—*the most comprehensive line of quality thermometers ever offered by ONE manufacturer.* Literature on request. WESTON Electrical Instrument Corporation, 617 Frelinghuysen Avenue, Newark 5, New Jersey.

Laboratory

ALL-METAL

—have readable, dial-type scales and corrosion-resisting stainless steel stems—stem lengths from 2" to 24"—ranges from low as −100°F. to high as 1000°F.—accuracy ½ of 1% of thermometer range.



GLASS

—certified sets of ASTM Testing thermometers with overlapping ranges in protective case. Ranges from −36°F. to high as 760°F. Also precision and standard etched stem thermometers for general testing.

Industrial

ALL-METAL

—provide unmatched readability and durability—accuracy within 1% of thermometer range. Available in all types, ranges and stem lengths (2½" to 72") for all requirements.

GLASS (Metal Case)

—available in all forms, all ranges, stem lengths and connections. Accuracy within one scale division. Also submarine types, metal and cupcase thermometers.

Remote Reading

ELECTRICAL

—resistor bulb sensing element permits mounting indicator any distance away from point of measurement. *Multiple* remote readings also possible by use of selector switch and several bulbs.

PRESSURE ACTUATED

—for remote reading, in 5, 6 and 8" dial sizes. Ranges from low as −325°F. to high as 1000°F. Accuracy one scale division unaffected by vibration or severe shock. Cases of iron, brass, or plastic.

WESTON Temperature Instruments

9413

— TO INDICATE — RECORD — CONTROL

Niagara's HYGROL DRIES AIR BEST

with exact moisture content

- to control your product's quality
- to prevent condensation on your product or material
- to prevent changes due to moist air in contact with your product
- to protect your material from dampness
- to protect your processing of moisture-sensitive material
- to DRY your material or product
- to pack or store your product safe from moisture damage
- to get exact moisture control for the precise atmosphere condition you need
- to provide precise atmospheric conditions for testing
- to increase your air conditioning capacity
- to DRY large quantities of fresh air from outdoors

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

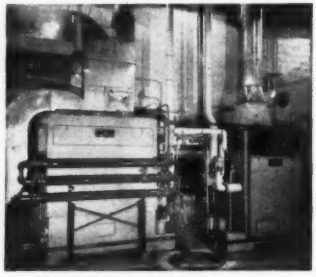
Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because . . . no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.



Niagara Controlled Humidity Air Conditioning

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

For complete information write

NIAGARA BLOWER COMPANY

Dept. FI, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

Storing Frozen Concentrates

Question—We operate frozen storage warehouses. Recently, complaints have come to us from retailers in respect to receiving slushy instead of solid frozen citrus concentrate. Temperatures in our warehouses are constantly kept at about 0 deg. F. So, too, are the temperatures in distributing trucks. Can you suggest where the trouble might lie and how it can be avoided?

Answer (by W. R. Roy, Director of Research, Minute Maid Corp., Plymouth, Fla.)—It is possible that the concentrates are entering your warehouses at temperatures above 0 deg. F. If this is the case, then the fault does not rest with you but somewhere between the concentrator and your warehouses. Terminal storage warehouses are designed to hold frozen concentrates at 0 deg. F., rather than to lower the temperature of products received to 0 deg. F.

So check the temperatures of some of your incoming shipments. If the concentrate has warmed up to 15-20 deg. F. during transit, some of the product subsequently stored in the center of stacks might take a week or more to reach 0 deg. F. At the same time, considerable loss in product quality might occur.

Because of their high solids content, juice concentrates have a low freezing point. Moreover, this point is not sharp. A 42 deg. Brix orange concentrate slush-freezes at 18 deg. F., and it does not freeze solid until it reaches −5 deg. F.

Slowness in lowering temperatures of concentrates in the 18 to 0 deg. F. range is attributed to the wide temperature range of latent heat in freezing. This effect is particularly apparent in concentrates that have inadvertently thawed or have reached temperatures above 0 deg. F. during handling.

K. Dykstra, Birds Eye Div., General Foods Corp., has pointed out that concentrates are held for long periods in break-up rooms, where temperatures are maintained as high as 40 deg. F.

Another possible source of difficulty might be holding cases of concentrate on receiving platforms or in certain distributing trucks, where 0 deg. F. temperatures are rarely maintained.

In our experience, one of the worst temperature abuses occurred in retail stores. Here, cases of concentrate have been stored adjacent to the frozen food cabinet for as long as 12 hr. This condition requently prevailed in supermarkets during rush days—Friday and Saturday.

Quite often, too, retailers have inadequate cabinet facilities, and they

stack cans of concentrate far above the cabinet's freezer plates.

I would strongly suggest that the warehouse operator follow several deliveries from his warehouses to the retailers' cabinets to determine where the abuse occurs and how it can be corrected.

Wants to Cool Peanut Butter

Question—Our present method of cooling jars of peanut butter is far from satisfactory. Cases of peanut butter are stacked 20-24 high on our shipping floor and then held there only 24 hr. Temperature of the peanut butter after filling and capping is in the 115-125 deg. F. range. And it is only after 96 hr. that the temperature of the peanut butter drops to 70-80 deg. F. Do you have any information on a more efficient method of cooling the peanut butter?

Answer—As you stated, your present method of solid-stacking the cases of peanut butter for 24 hr. is inefficient. We are told that cases of butter in the center of a stack do not cool as rapidly as the outer ones during the short 24-hr. cooling period. Subjecting the peanut butter to prolonged heat results in oil separation, and the oil then rises to the surface of the product. Oil separation not only adversely affects the appearance of the peanut butter, but it is also more susceptible to rancidification.

If, on the other hand, a hydrogenated fat or blend of such fats is used as a stabilizing agent, stack-cooling the peanut butter will have a detrimental effect upon the product—insufficient crystallization of the stablizing agents will take place when the butter is subjected to prolonged periods under high temperatures.

If you wish to continue stack-cooling the peanut butter, we suggest that you experiment with this method. Try reducing the height and width of your stacks. It may also be helpful to stack the cases with sufficient space between them so as to permit better

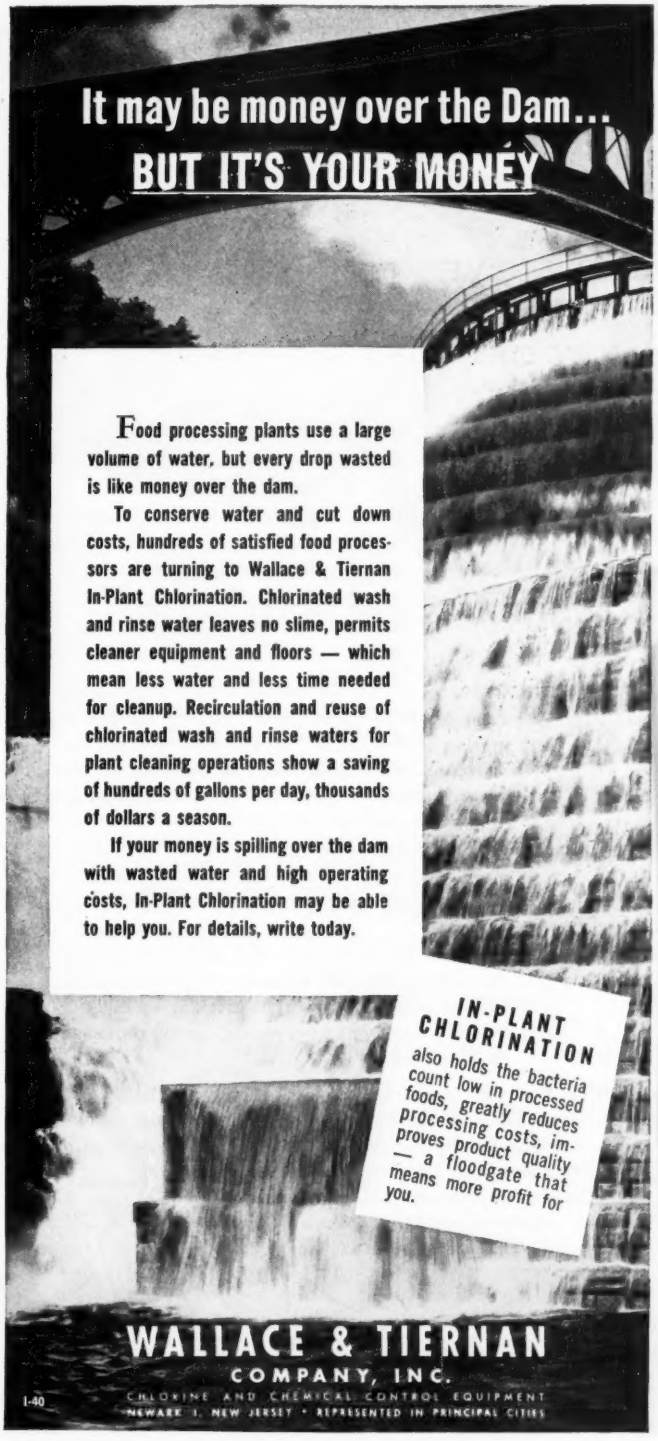
How Would *You* Do It?

Readers are invited to submit answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

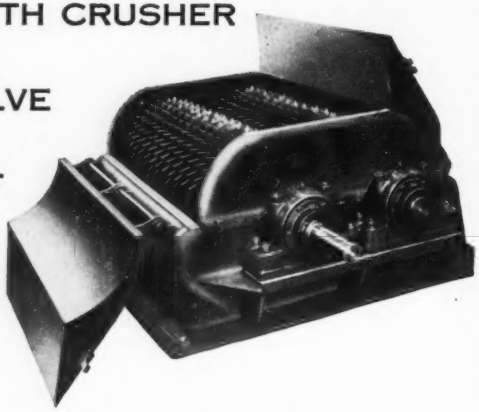
What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, "Food Engineering," 330 W. 42nd St., New York 36, N. Y.


It may be money over the Dam...
BUT IT'S YOUR MONEY
Food processing plants use a large volume of water, but every drop wasted is like money over the dam.
To conserve water and cut down costs, hundreds of satisfied food processors are turning to Wallace & Tiernan In-Plant Chlorination. Chlorinated wash and rinse water leaves no slime, permits cleaner equipment and floors — which mean less water and less time needed for cleanup. Recirculation and reuse of chlorinated wash and rinse waters for plant cleaning operations show a saving of hundreds of gallons per day, thousands of dollars a season.
If your money is spilling over the dam with wasted water and high operating costs, In-Plant Chlorination may be able to help you. For details, write today.
IN-PLANT CHLORINATION also holds the bacteria count low in processed foods, greatly reduces processing costs, improves product quality — a floodgate that means more profit for you.
WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES
I-40

why THE SPROUT-WALDRON SAWTOOTH CRUSHER CAN SOLVE MANY OF YOUR COARSE SIZE REDUCTION PROBLEMS:



because of its unique design, the Sprout-Waldron Sawtooth Crusher can provide either a shredding, tearing or shearing action. The type of action delivered depends upon the characteristics of the material being processed and speed differential at which rolls are run.

because of its shearing action, the S/W Sawtooth Crusher can perform many size reduction operations with a minimum of fines.

because of its tendency to pull materials into and through the reduction elements, the S/W Sawtooth Crusher is used extensively in breaking up cakes or sheets as discharged from presses, cooling conveyors or drier belts.

why not write for complete details about how the S/W Sawtooth Crusher can help to solve *your* coarse size reduction problems? Our wide experience in solving *many* types of size reduction problems in the chemical processing and allied fields is always at your service. Write to Sprout-Waldron & Co., Inc., 35 Logan St., Muncy, Pennsylvania.

S W MUNCY, PA.

SPROUT-WALDRON

The Best in **PROCESSING EQUIPMENT** *Since 1866*

253-A

air circulation, and thus more rapid cooling.

You might also look into the possibility of running the capped jars through a continuous cooler currently being used by the jam and jelly industry. While traveling through this unit on a wire-mesh conveyor, jars are sprayed with a fine mist of cold water from nozzles above and below the conveyor. Jars can then be labeled, cased, and immediately shipped out of your plant.

Some manufacturers are even continuously cooling peanut butter in heat-exchangers prior to the filling and capping operations.

Keeping Crackers Crispy

Question—Please advise us if sodium phosphate, or any other ingredient, can be added to crackers to prolong their crispness after the package is opened. If so, what amounts should be used?

Answer—We know of no ingredient to prevent crackers from losing crispness once the wrapper is removed thus exposing them to humid conditions. The fact that crackers are double-wrapped is evidence that bakers are not using a crispness-retaining agent in their formulas.

However, crackers that do not contain hygroscopic sweetening agents—corn syrup and invert or brown sugars—will remain fresh longer. The lower the sugar content, the longer the crispness retention.

Slow baking must be avoided because sucrose sugar tends to carmelize and invert, thus causing the crackers to lose crispness.

It may be pointed out that the pH of a soda cracker during baking plays an important role in the final quality of the product. Crackers with a normal pH increase during baking (up to 1.2, with 0.8 as an average) are good in flavor, pleasing in appearance, and light in weight. But crackers with an abnormal pH increase (1.2-2.5) are characterized by an off-odor and browning.

Abnormal pH increase during baking is due to: (1) Undesirable bacterial fermentation (due to variations in the microbiological condition of the fermentation troughs); (2) effect of protein in doughs on oxidation-reduction enzyme systems, activated by metal cations, especially iron; (3) interaction between sodium ion and protein; and (4) a pH above 6.5 in dough at the break.

In the manufacture of soda crackers, salt and sodium carbonate are introduced at the dough stage (10-12.5 lb. of salt and 5-7 lb. of sodium carbonate per 1,000 lb. of flour).

taste the difference yourself . . .

For years Huron MSG has been used by leading canners to enhance the natural good flavors of their products—with a direct effect on sales. Nothing experimental about it—its advantages have been long proven. No complications—no change in formula required—just add a little Huron MSC, from 1 to 2 oz. per 100 lbs. of finished product, on an average, is enough to materially strengthen and bring out all the naturally good flavors of the products.

Why not taste the difference yourself . . .
Write for FREE sample and directions for use.

THE HURON MILLING COMPANY • 9 PARK PLACE, N.Y.C. 7
Factories: Harbor Beach, Michigan
Sales Offices: 161 E. Grand Ave., Chicago 1 • 383 Brannon St., San Francisco 7 • 13 E. Eighth St., Cincinnati 2

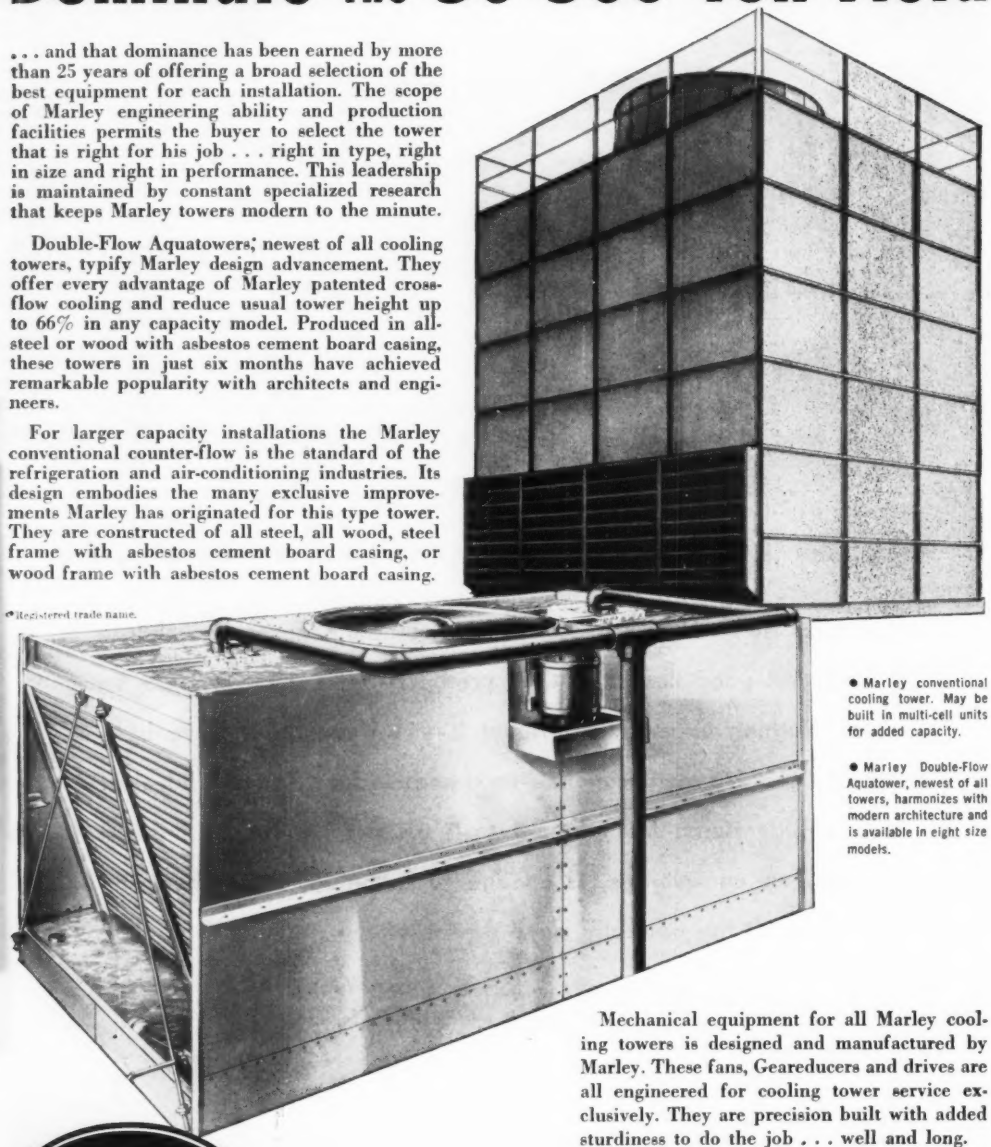
MARLEY Cooling Towers Dominate the 50-500 Ton Field

. . . and that dominance has been earned by more than 25 years of offering a broad selection of the best equipment for each installation. The scope of Marley engineering ability and production facilities permits the buyer to select the tower that is right for his job . . . right in type, right in size and right in performance. This leadership is maintained by constant specialized research that keeps Marley towers modern to the minute.

Double-Flow Aquatowers,* newest of all cooling towers, typify Marley design advancement. They offer every advantage of Marley patented cross-flow cooling and reduce usual tower height up to 66% in any capacity model. Produced in all-steel or wood with asbestos cement board casing, these towers in just six months have achieved remarkable popularity with architects and engineers.

For larger capacity installations the Marley conventional counter-flow is the standard of the refrigeration and air-conditioning industries. Its design embodies the many exclusive improvements Marley has originated for this type tower. They are constructed of all steel, all wood, steel frame with asbestos cement board casing, or wood frame with asbestos cement board casing.

*Registered trade name.



● Marley conventional cooling tower. May be built in multi-cell units for added capacity.

● Marley Double-Flow Aquatower, newest of all towers, harmonizes with modern architecture and is available in eight size models.

Mechanical equipment for all Marley cooling towers is designed and manufactured by Marley. These fans, Geareducers and drives are all engineered for cooling tower service exclusively. They are precision built with added sturdiness to do the job . . . well and long.

MARLEY

The Marley Company, Inc.

KANSAS CITY 5, MISSOURI

Troubled With Accidents

Question—We are faced with a problem in our sausage kitchen and meat-cutting and boning departments—preventing accidents due to wet, slippery duck boards. Our workers stand on these boards to keep their feet off the wet floors. However, the boards become slippery and thus introduce a hazard. Have you any recommendations?

Answer—There are several possible solutions to your problem, depending upon how much you are willing to spend to correct it.

One of the simplest and least expensive corrective measures is to apply strips of an abrasive-coated fabric to every second or third board and thus provide non-skid surfaces. Material of this sort is on the market, and your regular source of safety supplies can probably furnish it. You could even make your own abrasive-coated fabric by merely using water-proof glue, light canvas duck, and powdered emery or fine sand for the roughening agent.

Another solution would be to furnish the workers with strap-on footgear with a non-skid sole. Again, your regular supplier of safety goods may be able to help you. This type of footgear will also minimize accidental slipping on packinghouse tile floors.

Still another possible solution. Replace the wooden duck boards with rubber matting or low platforms provided with non-skid steel grating surfaces. Wooden boards are difficult to keep clean and they do not last as long as rubber or metal surfaces.

You might wish to try both the rubber matting and steel grating surfaces on an experimental basis, and get your workers' reaction before making a decision.

Handling Skids and Pallets

Question—In our transition from skids to pallets, we have encountered difficulty in finding a suitable type hand truck, which is flexible enough to handle both. Platform-type trucks, which were formerly used, will not pick up the pallets. On the other hand, pallet-type trucks do not have sufficient lift to handle the skids that we are still using. Can you suggest suitable handling equipment?

Answer—Simplest solution is to employ a hand-pallet truck, fitted with a pivoted, metal platform adaptor. This platform can be raised and locked into a vertical position at the handle-end of the truck when handling pallets. In this position, the platform will not interfere in pallet-handling operations.

Then, when you wish to switch to

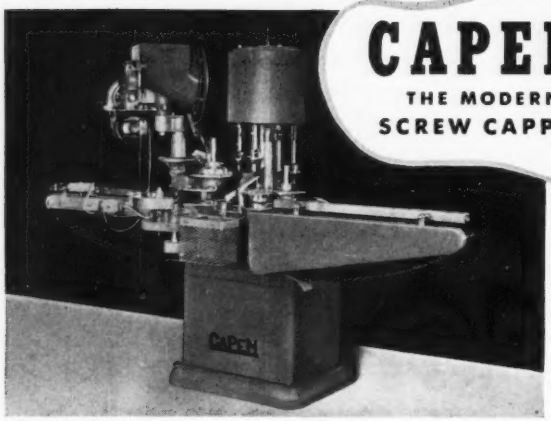
Wisconsin packer speeds up
vegetable processing
● Greatly increased output . . . less hand work . . . better product . . . more profitable operation . . . with fewer labor problems. Those were the results when this leading packer installed Cyclone Equalized Spiral Belts to carry mixed vegetables through automatic washing and quick freezing operations.
In *your* plant, too, there may be some operation that could be handled faster, better or more economically with the installation of a Cyclone Conveyor Belt. They are available in three styles—Spiral Woven, Flat Wire and Flex-Grid—one just right for your needs. Why not write Dept. H-102 for a free copy of our Catalog #4.
U·S·S CYCLONE
METAL CONVEYOR BELTS

CYCLONE FENCE DEPT.
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY
WAUKEGAN, ILLINOIS

USS

UNITED STATES STEEL

AUTO-LITE
...for
TEMPERATURE
RECORDING
★ This low-cost protection gives permanent proof of temperature behavior.
★ Various standard chart ranges from minus 40°F. to plus 550°F.
★ 3 standard types; choice of 24-hr. or 7-day cycle.
Send for new catalog G-143-B, describing many styles of Auto-Lite temperature indicators and recorders.
Model "500"
Temperature Recorder with capillary tubing for EYE-LEVEL reading. Priced from $42.50.
THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO
TEMPERATURE RECORDERS & INDICATORS



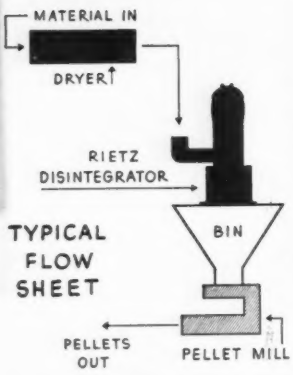
CAPEM
THE MODERN SCREW CAPPER

- Applies any type of standard screw cap or cover at speeds of 2,000 to 10,000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

CASE HISTORY SERIES



TYPICAL FLOW SHEET

FEED PREPARATION AHEAD OF PELLET MILLS

For coarse grinding of dried Sugar Beet Pulp ahead of pelleting machines a 75 H.P. Rietz RDH-18 Disintegrator operates at a capacity of 10,000 pounds per hour. The uniformity of grind produced by the Disintegrator makes possible a greatly increased capacity output from the pellet mills resulting in reduced capital investment requirements per ton of material produced.

Rietz Disintegrators are also used in preparing many other feed materials ahead of pelleting machines with similar savings or the production of a better product.

Write for free technical bulletin covering the above installation

Equipment for the food and chemical process industries

Rietz MANUFACTURING CO.
Santa Rosa, California

handling skids, the platform can be unlatched and lowered over the forks to make an improvised platform truck.

Design of the platform should be simple for a maintenance department having access to the truck, pallet, and skid sizes. Hand-truck manufacturers can furnish you with any additional information as well as supply you with the necessary type of platform attachments.

Making Sandwich Biscuits

Question—Please furnish us with a formula and instructions on the manufacture of sandwich-type biscuits with vanilla-flavored filling.

Answer—In preparing batter for the biscuits, mix at low speed for 5 min. in a vertical-type mixer: 6x sugar, 100 lb.; Pro Flo (cottonseed flour), 11 lb.; shortening, 75 lb.; milk powder, 5⅝ lb.; salt, 3¾ lb.; vanilla flavor, 15 oz.; and baking soda, 2 lb., 7 oz.

Now add and mix for 3 min. 25 lb. of invert sugar. Next add a solution containing 1 lb. of ammonia and 5 lb. of water, and mix into the batch. Finally, sift 419 lb. of soft winter flour and mix alternately into the batch with 41 lb. of water.

The resultant stiff batter is then deposited on a stainless steel band conveyor traveling through a tunnel-type oven.

Filling for the sandwich-type biscuits is made in the following manner: Cream the following ingredients for 10 min. at moderate speed in a vertical-type batch mixer: 6x sugar, 321 lb.; coconut oil (76 deg. F. melting point), 166⅔ lb.; vanilla 3½ oz.; very fine salt, 9 oz.; and powdered citric acid, 3 oz. The citric acid powder should be sifted with about 10 lb. of flour before adding to the mixing bowl.

Then add dextrose sugar, 80 lb., and hydrogenated fat, 10 lb., and then cream the mixture for an additional 4 min.

To make the sandwiches, filling is deposited on one biscuit, then topped with another biscuit.

More on Evaporators

Following is another answer to the July question on increasing the output of several small multiple-effect evaporators.

Answer—We have increased the capacity of double-effect evaporators at two plants by cross-connecting two double-effect, low temperature units in series. This arrangement provides four-stage evaporation, with only the last stage handicapped by a low evaporation rate working at a 58-deg. Brix density.

At another plant similar series connections have been made. Here, four 4,000 lb., three-stage units have been hooked up in series to provide twelve stages of evaporation. Also, two 10,000-lb. units have been connected in series to furnish four stages and thus increase the evaporation rate to 22,000 lb. per hr.

At still another plant, two 10,000-lb. units have been arranged in series to give six stages and increase the capacity to 22,000 lb. Now we are adding an additional stage. When completed, this will be a seven-stage single-effect unit with a capacity of 25,000 lb. per hr.

This system will not require an increase in the ammonia-compression capacity.

In these low temperature units, the latent heat of water vapor is first transferred to boiling ammonia. Temperature of the ammonia vapor is then raised by compression, and the latent heat is then transferred to the boiling product—the juice being concentrated—to produce more water vapor.

You might be interested in the following data on the comparative economy of low temperature vs. steam recompression evaporation in two different plants.

In one plant, we installed low temperature units with 40,000 lb. of evaporating capacity. Total evaporation requirements are 1,600 hp., necessitating 1,200 kw. of power, which costs 3c. per kw., or $9.00 per hr.

In the other plant, there are six steam-recompression type evaporators, with a total of 36,000 lb. capacity. Recently, we succeeded in getting steam and water flow meters in a line of two similar units. We found six units use 66,500 lb. of steam per hr. and the astonishing total of 2,200 gpm. per evaporator of 80-deg. F. water. This is equal to 13,200 gpm., or 19,000,000 gal. per 24-hr. day for the six units.

For pumping the water alone, this would require 600 hp., or about 450 kw. Because of the low power factor, it would cost $0.016 per kw., or $7.20 per hr. Fuel oil requirements are 660 gal. This amount of fuel produces 66,500 lb. of steam from the 80-deg. F. water. And this oil costs $0.05 per gal., or $33 per hr.

To sum it up: Fuel and water costs in the plant using the low temperature units run $9.00 per hr for 40,000 lb. of evaporation. On the other hand, cost of operating steam-recompression type units in the second plant is $42.20 per hr. for 36,000 lb. of evaporation. And yet, the capacity of this plant is 10 percent less than the one using low temperature units.—*J. A. Cross, Mojonnier Bros. Co., Chicago.*

Morningstar

A *DEPENDABLE SOURCE* FOR FOOD STARCHES AND THICKENING AGENTS

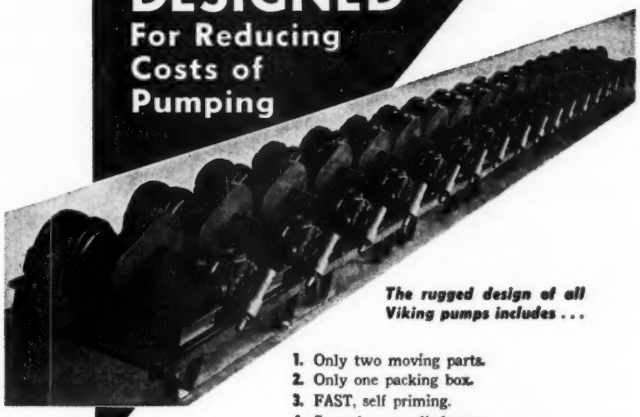
More and more Food Product Processors from coast to coast are depending upon MORNINGSTAR for Food Starches and Thickening Agents. Direct importers and manufacturers, MNI can ship quickly and economically in any quantities from a few 100 pound paper bags to many carloads. MORNINGSTAR BRAND Products are scientifically prepared and laboratory controlled to precise standards of *uniform* fine quality. They'll add new texture and appeal to many foods.

POTATO STARCH..ARROWROOT FLOUR
TAPIOCA FLOUR..LOCUST BEAN GUM
SOLUBLE STARCHES AND DEXTRINES

WRITE US—TELL US ABOUT YOUR NEEDS!

MORNINGSTAR, NICOL, INC.
[illegible] WEST 51st STREET, NEW YORK 19, NEW YORK
1780 CANALPORT AVENUE, CHICAGO 16, ILLINOIS

DESIGNED For Reducing Costs of Pumping



The rugged design of all Viking pumps includes . . .

1. Only two moving parts.
2. Only one packing box.
3. FAST, self priming.
4. Smooth, even discharge.
5. Adaptation for handling either viscous or thin liquids.
6. Low power requirements.

Lower your pumping costs. Start with bulletin 52SE. Gladly sent on request.

by VIKING

Viking PUMP COMPANY
Cedar Falls, Iowa

IT'S
EASY
TO
KEEP

BALDWIN
SUPERTEX*
*Reg. U.S. Pat. Off.

WHITE NEOPRENE
CONVEYOR BELTING

CLEAN!

You can clean SUPERTEX easily with soap and water, steam or any concentrated cleaner without removing the belt from the pulleys. The attractive white color lasts as long as the belt itself. This is one of the many reasons why SUPERTEX is used by so many leading food manufacturers. Here are six more.

(1) RESISTANT TO VEGETABLE OILS. Improved Neoprene WRT gives even greater resistance than before.

(2) TASTELESS. Food products can be carried directly on the belt.

(3) NON-TOXIC, ODORLESS. Supertex is safe. It meets all sanitary and health requirements of the food industry.

(4) STRETCHES LESS. Multiple plies of lightweight close woven duck give added strength with greatly reduced stretch.

(5) LEAVES NO IMPRESSION ON PRODUCT. Perfectly smooth top cover because it is calendered and press cured.

(6) ACID-ALKALI RESISTANT. Important in food processing, and in other industries where acid and alkali fumes are present.

Ask now for further information.

Get the facts too on TREAD-TOP for conveying packages up inclines of 25-30 degrees. Write for technical data.

BALDWIN
BELTING, INC.
76 MURRAY ST., NEW YORK 7, N. Y.

Useful New Books & Government Publications

Science of Food Explored

FOOD SCIENCE: A SYMPOSIUM ON QUALITY AND PRESERVATION OF FOODS. *Edited by E. C. Bate-Smith and T. N. Morris. Published by Cambridge University Press, 32 E. 57th St., N. Y., 1952. 319 pages; 6¼ x 9½ in., cloth. Price $8.*

Here, 26 authorities give their findings and opinions. Though of primary value to food research laboratories, the subject material is profuse, thus offering topics of broad interest in the food industry.

Treated in detail are such principal foodstuffs as meat, fish, eggs, fruits and vegetables, potatoes, and cereals. Discussions are extended to include basic constituents of foods generally, their varied quality, causes of spoiling and decay, and fundamentals of food preservation.

Apparent in the tenor of this well-illustrated book is a constant appreciation of the study of food as a science.

Of sidelight interest to this country is a short chapter on economics, supply, and distribution of food in the United Kingdom.

Re Steel Shipping Containers

DIRECTORY: 1952-1953. *Published by Steel Shipping Container Institute, Inc., 600 5th Ave., New York 20, 1952. 36 pages; 8½x11 in.; paper. Available free.*

This directory of manufacturers covers 90 percent of the national production of steel shipping containers.

Included are factual data on annual production of varied types of containers plus statistics on their utilization.

Equipment for Dairies

MODERN FARM DAIRY EQUIPMENT. *By Ronald T. Needham. Published by Leonard Hill Ltd., 9 Eden St., London, 1952. 91 pages; 5½ x 8½ in., cloth. Price 15s.*

Photos and diagrams bedeck this small, fact-filled volume on dairy plants. The former are generally confined to equipment, the latter to plant layout, with dimensions dependent on herd size.

In detailing steps necessary to building an adequate plant structure, the author makes two observations: (1) That the most common mistake is to underestimate space necessary in milk cooling, washing, and sterilizing rooms for efficient and economical operation, and (2) that installed equipment is nominally unable to handle future increases in production. The author proceeds to allay these errors.

In all, there are six chapters, their titles self-explanatory: "The Dairy Buildings", "Milk Cooling Equipment", "Importance of Sterilizing", "Heat Treatment and Bottle Filling Equipment", "Dairy Layout Plans", and "Data and Tables".

New Credit Work

DUN & BRADSTREET REFERENCE BOOK. *Published by Dun & Bradstreet, Inc., 99 Church St., N. Y., 1952. 4,160 pages; 12 x 16½ in., Fabrikoid. Available on subscription basis only, with price related to credit services retained.*

Task of redesigning and restyling this famous, time-honored business standby is now complete. The work represents two years of painstaking research and revision. Especially noteworthy are two improvements—a new type face providing greater legibility and a revised classification system affording greater clarity and precision than former symbols.

Since 1932, D&B has distributed its regular editions—statistically revised—six times yearly. This is to parallel business changes, which occur at the rate of 6,500 daily.

In addition, a rapidly expanding economy during and since World War II necessitated changes in the new volume affecting 3,000,000 listings for the U. S. and Canada.

Brewing Facts Compiled

BREWING INDUSTRY SURVEY: 11TH ANNUAL EDITION. *Published by Research Co. of America, 341 Madison Ave., New York 17, 1952. 144 pages; 8½x11 in.; plastic. Price $35.*

To furnish complete statistical data on the brewing industry has been the goal of this current volume. And a very thorough volume has resulted.

Information given is divided into five sections: (1) History and manufacture of beer, (2) the U. S. brewing industry, (3) financial reports of leading brewers, (4) a brewery directory and annual sales figures, and (5) the brewing industry in Canada and Mexico.

Of special interest to U. S. brewers are items discussing sales, consump-

tion, profits, and working capital of domestic brewing concerns and those north and south of our borders. Statistics such as these—not always so readily available—are an invaluable asset in planning sales, expansion, and other programs.

Of note, too, is a classified directory of executive personnel which lists each company's president, manager, brewmaster, bottling superintendent, and advertising manager along with pertinent data.

Government Publications

DRY GRINDING OF AGRICULTURAL RESIDUES, A NEW INDUSTRIAL ENTERPRISE. *U. S. Dept. of Agriculture, Office of Information Services, Circular 336. Issued 1952, 36 pages.* It is estimated that 600,000 tons of mechanically processed agricultural residues are being used yearly. This current work details economies and improvements achieved in this production.

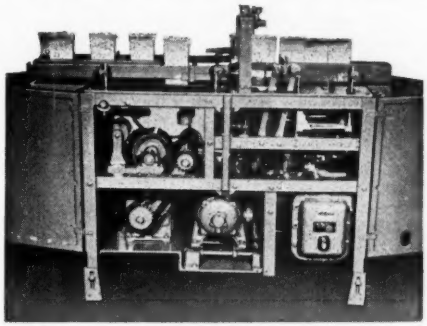
CHECK LIST OF USDA STANDARDS FOR FARM PRODUCTS. *U. S. Dept. of Agriculture, Production Marketing Admin. Issued 1952, 14 pages.* Covers mandatory standards on naval stores and export apples and pears. Permissive and tentative standards include dairy products, fruits, vegetables, meat, poultry, and sugar.

COMPARISONS OF TRANSIT DAMAGE, LOADING TIME, AND MATERIALS COSTS UNDER VARIOUS METHODS OF LOADING CANTALOUPES. 1951. *U. S. Dept. of Agriculture, Production & Marketing Admin. Issued 1952, 17 pages.*

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

ICE CREAM PRODUCTIVITY TRENDS, 1919 TO 1951. *U. S. Dept. of Labor. Issued 1952, 14 pages.* "The number of man-hours required to produce a gallon of ice cream was reduced 3 percent between 1950 and 1951 to the second lowest point on record." So states first line of this new report. It continues by revealing lowest point of man-hours required, combined with numerous facts and indexes on productivity trends in the ice cream industry over the specified period.

The SURE-WAY Automatic Checkweigher...



Interior View of SURE-WAY Checkweigher

The SURE-WAY Checkweigher automatically checkweighs and sorts filling line output into three classifications . . . overweight . . . underweight . . . correct weight. Since this weighing unit is not affected by wet, steamy or dusty working conditions it is ideal cost and quality control equipment for volume operations in canneries, seafood plants, condensaries, dairy products plants, all bottling operations and breweries as well as all types of frozen food packaging. Filling machine output is mechanically sorted at speeds up to 100 units per minute (this speed for packages of 16 ozs to 20 ozs down). Tolerance is adjustable within most any limits practical for the average packaging line. Here is proven equipment that (1) speeds production (2) saves product (3) materially cuts labor costs. SURE-WAY handles containers of any material . . . and in any size that will stand on a conveyor belt up to 8"x5½" x15" to a weight capacity of 10 lbs. Three different models are available. Write for details to fit your operation.

EXACT WEIGHT SCALES
Industrial Precision
THE EXACT WEIGHT SCALE COMPANY
910 W. Fifth Ave., Columbus 8, Ohio
2920 Bloor St., W., Toronto 18, Canada

heart of the strainer

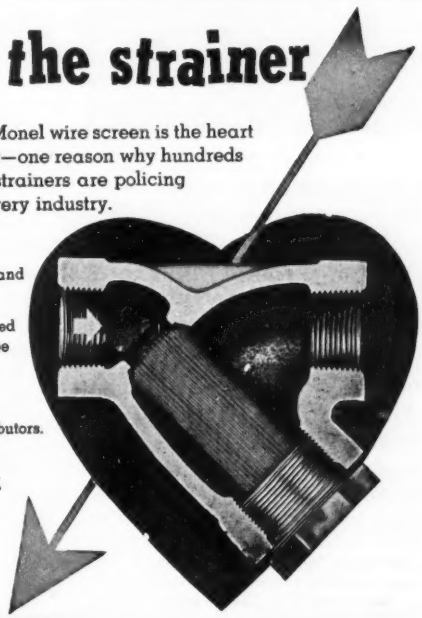
A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.

OTHER REASONS—

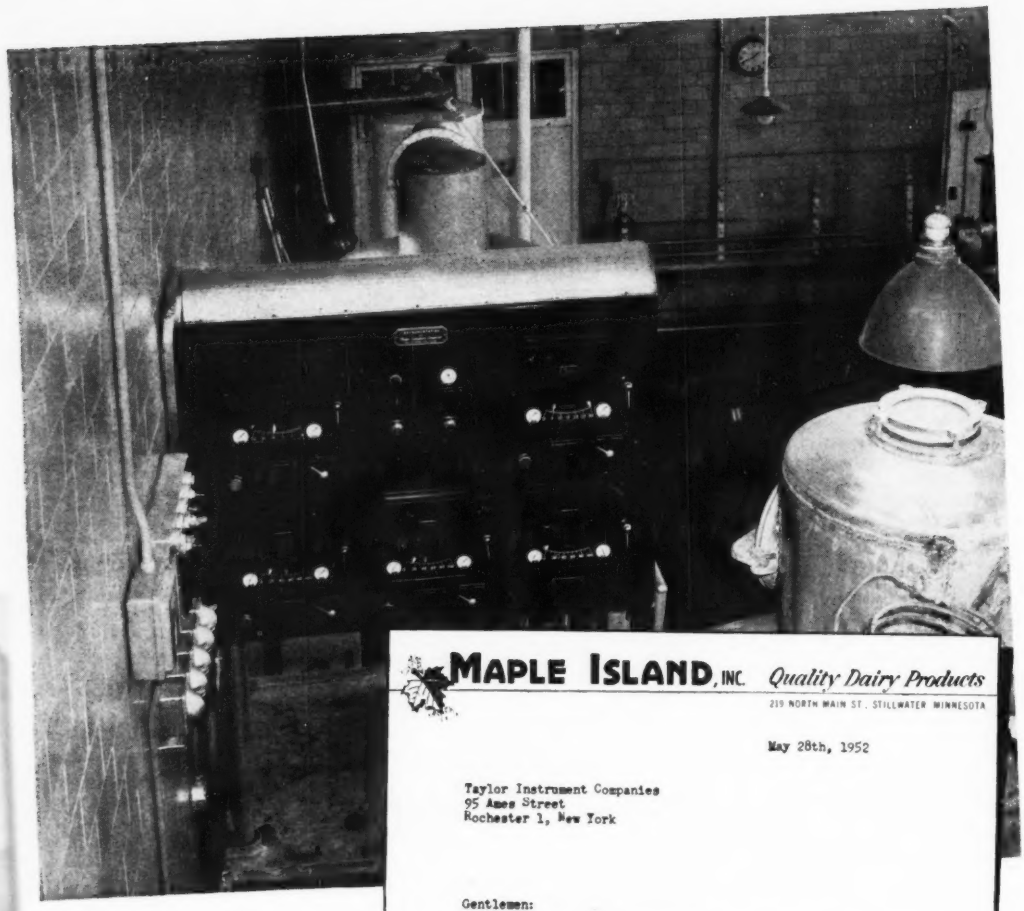
- cadmium plated bodies and screen caps
- straight threads, machined faces and spark-plug-type gaskets on screen caps
- ten sizes from ¼" to 3"

Sold by 216 industrial distributors. Write for Bulletin S-203.

YARNALL-WARING CO.
127 Mermaid Ave.
Philadelphia 18, Pa.



YARWAY STRAINERS



MAPLE ISLAND, INC. *Quality Dairy Products*

219 NORTH MAIN ST. STILLWATER MINNESOTA

May 28th, 1952

Taylor Instrument Companies
95 Ames Street
Rochester 1, New York

Gentlemen:

Assuming that complimentary remarks on the operation of your equipment are always welcome, we would like to comment on our satisfaction with the Taylor controllers on our Buflovak evaporator.

In 1948, you installed Taylor liquid level controls on our Buflovak evaporator. These controls have been in successful operation and have been continuously since that time. We feel that the use of the controls have resulted not only in increasing capacity, but have been particularly advantageous in producing condensed products more uniform in solids content.

We condense milk primarily for the use of spray drying. Uniformity in solids content is tremendously important in producing the dry product of the desired moisture and solubility characteristics. The controls, all of which are now operating satisfactorily, include liquid level control in the tail pipe and condensor water control and steam control, all of which work completely automatic. Prior to the installation of the controls, the pan required constant attention of one man. The same man now operates two pans.

Yours very truly,

MAPLE ISLAND, INC.

BY J. J. Becker
James J. Becker

JJB:LK

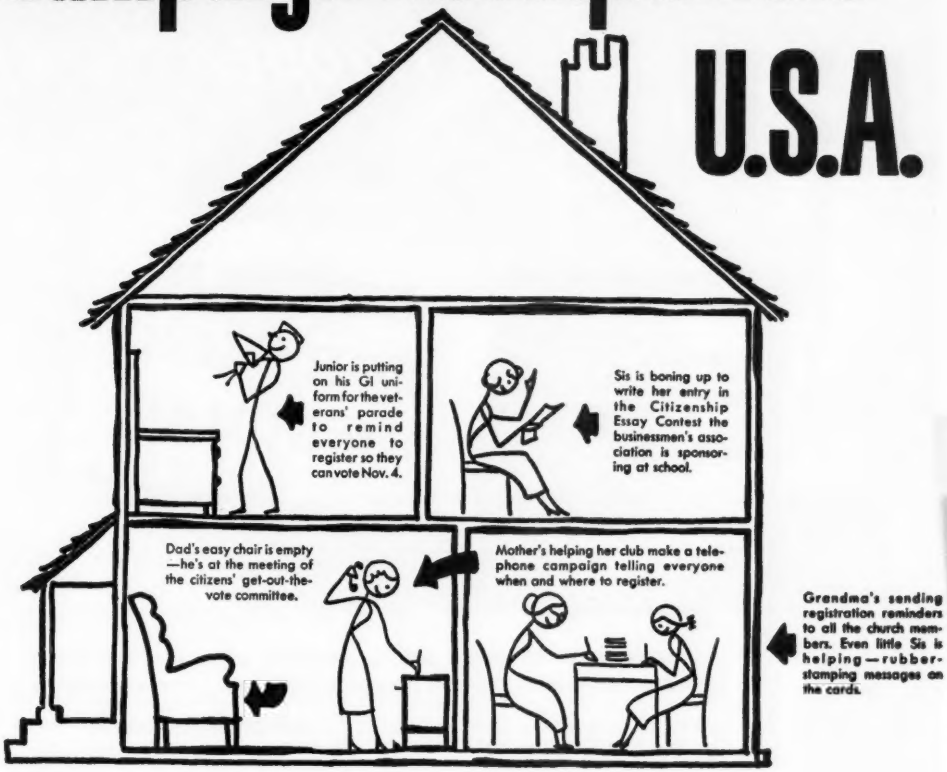
TAYLOR CAN DO the same for you...cut your costs and improve product quality no matter what kind of evaporator problem or other type by-product processing problem you may have. Ask your equipment supplier, or write for **Catalog 500A.**

Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

Campaign Headquarters U.S.A.


Junior is putting on his GI uniform for the veterans' parade to remind everyone to register so they can vote Nov. 4.
Sis is boning up to write her entry in the Citizenship Essay Contest the businessmen's association is sponsoring at school.
Dad's easy chair is empty —he's at the meeting of the citizens' get-out-the-vote committee.
Mother's helping her club make a telephone campaign telling everyone when and where to register.
Grandma's sending registration reminders to all the church members. Even little Sis is helping—rubber-stamping messages on the cards.

The Family Vote will elect the Next President

NOT THE FARM VOTE...
THE BIG-CITY VOTE...
THE LABOR VOTE...
OR ANY PARTY VOTE...

Politicians talk a lot about this and that "bloc" of voters being decisive factors in this election. So do all the pollsters. You can't blame them for trying to dope it out that way in advance . . . but . . .

YOU know you're going to vote your own sweet way when you get behind that voting booth curtain—that where you live or work hasn't got a blankety-bloc thing to do with how you'll vote. You'll vote for what you believe to be in the best interests of your family—your kids—and your kids' kids.

So YOU know that this year—as always—it will be the FAMILY vote that really decides things. And families are working as never before to make sure every American votes. Right now in millions of American families, everyone from Little Sis to Grandma is pitching in to remind every eligible American to register to make sure of the opportunity to vote. And then they'll tackle the job of getting out the vote of every member of America's 44,000,000 families. They're the biggest "bloc" in America—they ARE America!

If your family is already working at the job—congratulations! If you aren't, talk it over at supper tonight, and pitch in tomorrow.

. . . YET SCRAP INVENTORIES ARE ALARMINGLY LOW. *YOU* ARE BEING COUNTED ON TO HELP KEEP THE FURNACES WORKING . . . TO AID DEFENSE

With our increased steel production, the furnaces are gobbling up an enormous amount of iron and steel scrap.

More—far more—scrap than is at present going into their scrap stockpiles.

Many mills are operating on a hand-to-mouth basis. Some are already threatened with shut-down—for lack of scrap.

The Danger Is Increasing

Will efforts to fill the tremendous demands for steel fail because of lack of scrap?

Steel is made from 50% scrap. We could be severely handicapped—in our aim to keep abreast of both military and civilian requirements—if scrap suppliers can't keep pace with productive capacity.

But they *can* keep pace . . . with your help!

Enough Scrap IS Available!

Yes—the only problem is to get the available extra scrap from where it is—to where it's needed.

Where is it?

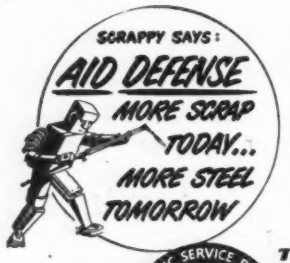
In *your* business . . . in the form of old machines and equipment, tools, implements, dies, jigs, fixtures, outmoded structures, chains, valves, wheels, pulleys—any old iron and steel that's rusting away.

Six Million EXTRA Tons Needed!

By the end of 1952, we'll be producing steel at an annual rate of 20 million tons more than in 1950. That means we will need at least 6 million more tons of scrap than we've ever needed before.

It's up to you. Write at once to Advertising Council, 25 W 45 St., New York 19, N. Y., for a free copy of "Top Management: Your Program For Emergency Scrap Recovery".

Please write today—there's not a day to lose.



NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by

McGRAW-HILL PUBLISHING COMPANY, INC.

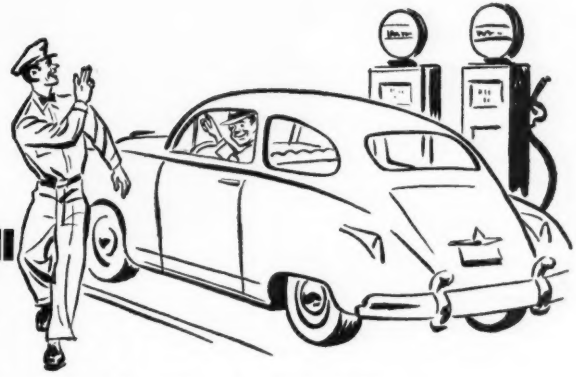
330 WEST 42nd STREET NEW YORK 36, N.Y.

A PUBLIC SERVICE PROJECT — THE ADVERTISING COUNCIL

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



Nobody knows for sure how it started—this line about "See you at the Polls!" we're hearing all over these days.

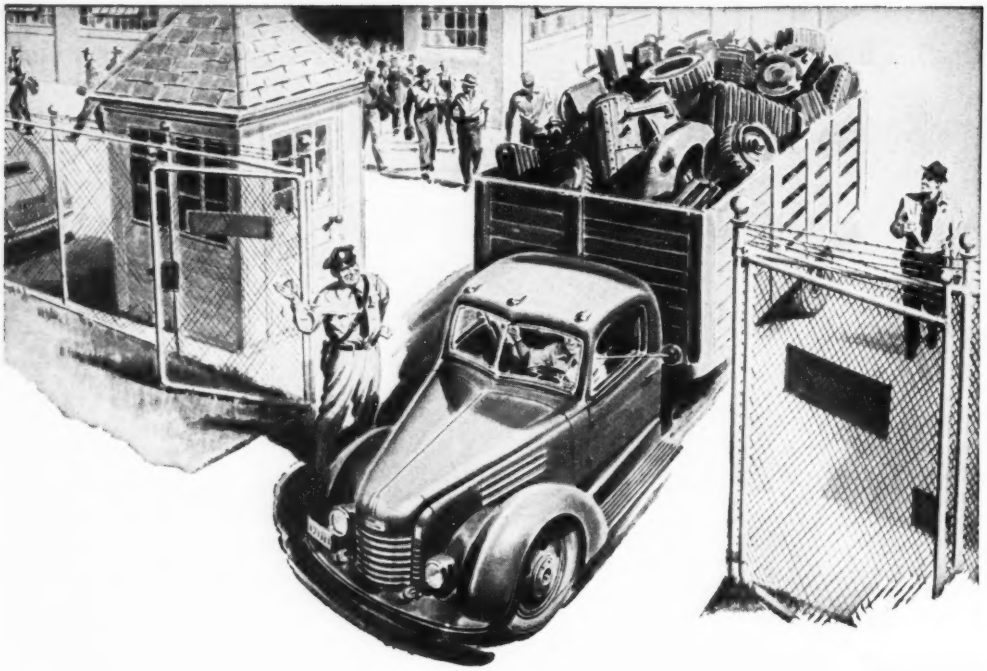
Best explanation seems to be that it came from that state candidate out west. . . . His opponent in a debate got all riled up and challenged him to fight it out in the alley.

But he said—"I'll settle this the AMERICAN way—I'll see you at the polls!" And the audience picked up the chant.

Now everybody's saying it—and on Nov. 4 everybody will be *doing* it!

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



Scrap's valuable!... Scrap's precious!

It's needed... badly... to maintain vital steel production.
Every plant has some—search out the iron and steel scrap in yours

Among the *most-needed* industrial commodities, today, is *junk*.

Yes—junk iron and steel, called *scrap*.

One half of the ingredients in making new steel is *old* iron and steel—collected from the waste of metal-working and from obsolete products made of steel.

6,000,000 EXTRA TONS NEEDED

Today, not enough scrap is being obtained from *normal* sources to meet the demand of increased steel production.

We must get *more* scrap from other sources. One of these sources may very well be *your* place of business.

HERE'S WHAT'S NEEDED

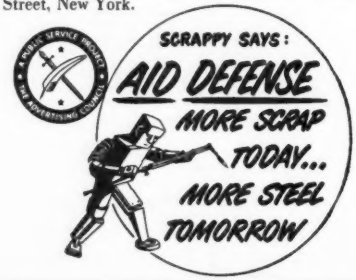
For help in this emergency, search your place for scrap; specifically: obsolete machinery and equipment . . . no-longer-used jigs and fixtures . . . worn-out or broken chain, wheels, pulleys, gears, pipe, etc. . . . abandoned metal structures.

If it's gathering rust or dust, it may be scrap—and more valuable being remade into steel than cluttering up your premises.

Write for booklet, "Top Management: Your Program for Emergency Scrap Recovery", addressing The Advertising Council, 25 West 45th Street, New York.

NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by



McGRAW-HILL PUBLISHING COMPANY, INC.
330 WEST 42nd STREET NEW YORK 18, N.Y.

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Higher Density Attained In New Tomato Paste

A tomato paste with a solids content of 36 percent is now being successfully canned by two California packers—Mor-Pak Preserving Corp. and Thornton Canning Co.

The system employed has, moreover, been used to produce pear, peach, and apricot purees.

Heretofore, packers have found that to go above the standard 26 percent paste concentration with conventional equipment invited "burning-on" of product.

Answer in the new method is a Mojonnier Bros. Co. vacuum finishing pan added to existing evaporators. Somewhat redesigned for processing the higher density paste, this unit has been widely used for condensing whole milk ahead of dryers.

The new tomato paste's quality and storage life are said to be as good as those of the conventional product. And approximately 44.5 percent more paste (36 percent solids) goes into the cans.

Also, use of the finishing unit in a conventional double-effect evaporator system is said to result in a steam economy sufficient to pay the rental cost of the equipment.

Since currently there are no USDA standards set for tomato paste above 26 percent solids, these initial packs are intended largely for re-manufactures.

Fluorinated-Water Test

A rapid new test for fluorides in water that will accurately determine concentrations ranging from 0 to 6 ppm. has been developed by two Cornell chemists.

Basis is the change of color occurring when fluorinated water is mixed with special iron-containing solutions. One solution, called resacetophenone, changes from a deep red to colorless, while the other, 5-phenylsalicylic acid, loses its purplish hue.

Exact concentrations of fluorine are determined with a filter photometer.

Ice Cream vs. Mellorine

Growth of "synthetic" cream-free frozen desserts—called "Mellorine" in Texas, and a variety of other coined names in Oklahoma, Missouri, and Illinois—is not getting outright opposition from ice cream makers. In fact many of the latter are making the product as a side-line themselves.

However, the National Milk Producers Federation is fighting the newcomer on grounds reminiscent of the butter vs. oleo conflict. For production of the "vegetable oil frozen dessert" is seen as an incursion on ice cream, now consuming the equivalent of 10 billion pounds of milk annually.

The new dessert is now legal in the above-mentioned states, and Arkansas is currently considering standards for the new product.

Terramycin, Penicillin Spur Corn, Radishes

Significant stimulation in the growth of sweet corn and other vegetables can be produced by infinitesimal quantities of antibiotics, according to Dr. Louis G. Nickell, head of photochemistry, Chas. Pfizer & Co.

Growth responses of sweet corn occurred when the plants were given as little as 1 ppm. terramycin in water. The antibiotic also increased percentage of germination.

In other experiments it was shown that application of penicillin at the rate of 10 units per gram of soil produced radishes averaging two and three times as large as those growing in untreated soil.

Key Problems, Challenges Are Weighed by Leaders

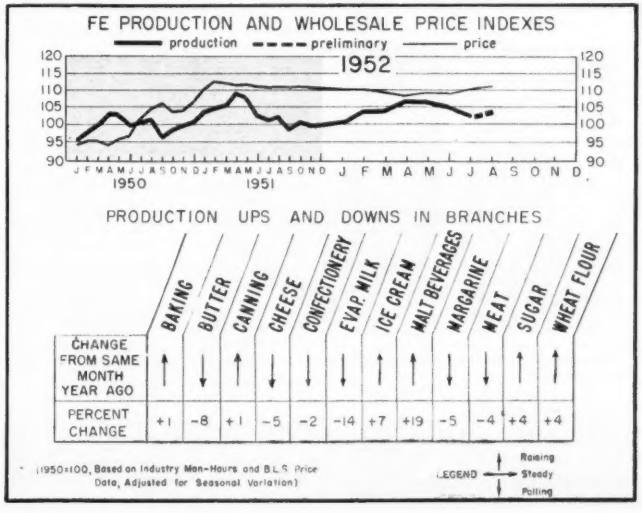
Problems faced by the food industry as it takes the road ahead were sharply spotlighted by industry leaders in the Symposium on Foods at the recent Centennial of Engineering Convocation in Chicago.

Technological aspects were ranged by John Holmes, president of Swift & Company; the engineer's contribution was examined by Charles Glen King, scientific director of the Nutrition Foundation; and distribution factors were weighed by Ned N. Fleming, president of The Fleming Co., Inc., of Topeka, Kan.

"The challenge confronting the food industry," declared Mr. Holmes, "calls for the best in engineering skills, inventive genius, and redoubled support and interest in scientific research on all food fronts.

"Food," he continued, "is the world's greatest need. How well America develops in the next century will depend in a great degree on how good a job all of us are able to do in helping build a healthy, vigorous nation. It depends on the continuation of the freedom which made America great—so that free, individual enterprise can get on with the job of providing more goods for more people at lower costs."

Mr. King began with a bow to our total food practices, pointing out that



WAHL-HENIUS INSTITUTE

1135 Fullerton Ave., Chicago 14

Established 1886 Eastgate 7-7647

Consultations — Product Development, Quality Control, Plant Sanitation Waste Disposal

Research — Product and Process Improvement By-Product and Waste Utilization Sewage Disposal

Analyses — Biological, Chemical, Flame and Spectrophotometric

SERVING FOOD PROCESSING AND FERMENTATION INDUSTRIES

Meet the Schedule!

Use PIONEER Stanzoils®

When employees hands are comfortable and properly protected by the *right* gloves for the job:

- there are fewer work stoppages
- injury claims decrease
- work goes faster, production increases

—all at lower per hour glove cost to your plant!

NW-32 medium weight all neoprene white glove for food and liquid processing. 11" length. Straight finger style fitted to permit almost bare-hand freedom.

Long-wearing liquid-tight neoprene Stanzoil industrial gloves resist damage from acids, oils, solvents, caustics. 32 styles, weights, sizes, colors. New PIONEER catalog shows you *at a glance* how to select the most efficient and economical gloves for each operation. It pays you to write for your copy today.

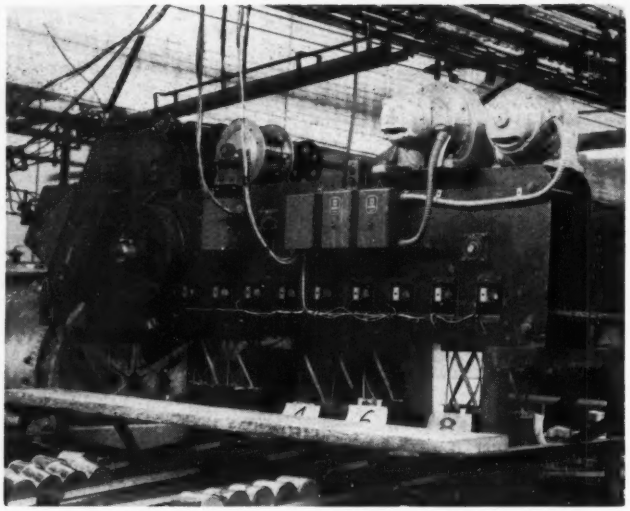
Industrial Products Division

The PIONEER Rubber Company

642 Tiffin Road • Willard, Ohio

STANZOIL PIONEER

Quality Gloves for over 30 Years



Invisible Marks Identify Cans

To permit processing of various types and grades of canned fruit simultaneously in unlabeled cans, Schuckl & Co. has installed magnetic can-marking and sorting equipment in its California cannery. Located ahead of each can filling station, markers magnetize each can bottom with N and S poles in a magnetic-cycle code pattern. This later operates sorter by frequency generated when can is spun. So filled cans can be mixed for efficient processing then unscrambled and directed to the proper labelers or storage point. Shown here is one side of nine-channel sorter, with three channels in operation. (Photo courtesy *Electronics*)

they "were never before so good as they are in 1952, whether measured by the yardstick of pleasure, health, efficiency, reliability, or the efforts of man to build a world in which law and moral values have a rightful place."

But he then tempered these thoughts, saying: "We have simply made progress, however, without solving some very great problems. Students of public health, agriculture, population trends, and political administration know that our food resources in the years ahead are going to be under greater pressure for increased efficiency than ever before.

"I think it can be said fairly that great engineers have a special genius in working with men and materials. In the food industry, the engineer's responsibilities are enormously magnified by the fact that his raw materials of today literally make the men of tomorrow.

"Nature has given us no alternative to recognizing the fragile nature and great complexity of an ever-growing list of nutrients—now about 50—that are essential to human life."

New Profession

Mr. King then made special note of the "birth of a new profession," declaring:

"The century's transition from simple farm labor to farm and food engineering is reaching with startling rapidity into the dining rooms of the entire world. Mechanically and economically, the service thus rendered is essential to our social structure, but its future success is dependent upon more efficient integration with the sciences of biochemistry and public health. The contemporary scene is witnessing the birth of a new profession—biochemical engineering. This development marks the beginning of a new age in industry, in agriculture, in public health, and in the enjoyment of living.

Mr. Fleming made particular note of price and profit pressures in distribution. "While the industry has," he said, "greatly reduced its cost of operation per dollar of sales over the last 20 years, nevertheless, 1952 finds an increase in operating cost over 1951 and a decrease in gross margins."

Earlier he had cited a study by the Harvard School of Business which had shown average gross margin of the better retail food stores to be 24 percent in 1934—whereas in 1950 it was only an approximate 18 percent.

"So today," he went on, "food distributors, both wholesale and retail, find their net profit greatly reduced to a very thin margin. Thus, the need for improved methods is intensified."

They'll Package It for You

A contract packaging service is now available to western food processors from Automatic Packaging Corp. of Los Angeles, newly formed by Ajax Hardware Mfg. Corp. The service specifies use of plastic foil or paper heat-sealed bags up to 5¾ by 13 in., with capacity ranging from lg. to 1 lb.

The firm states its plant affords features for rigid control, with air conditioning and modern sanitation. And it is prepared to employ appropriate devices for handling of products, including coding and dating. Further, a complete service is available, if desired, from design to carton, and carrying on through warehousing and shipping.

The company recently completed several government packaging contracts, including 25 million packages of powdered milk.

Up in Spinach, Asparagus

Rises of 6 percent in the '52 spring pack of frozen spinach and 5 percent in this year's pack of frozen asparagus are reported by the National Assn. of Frozen Food Packers. The spinach total—a record high—was 58,286,756 lb., while the preliminary figure on asparagus of 24,811,760 lb. was the second largest recorded (top was 28,316,074 lb. in '46).

Puts "Flow" in Sugar

In this large storage tank in the C & H plant in Crockett, Calif., sugar is conditioned against lumping and caking by blowing filtered air through it. Air removes the minute traces of moisture that cling to sugar crystals as they emerge from refining process. Resulting product is free flowing in transit and storage. Filter and blower units are seen in left foreground.

STEEL

Every Kind

Some steel products are in short supply but over-all stocks are still large, diversified

Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . . .

RYERSON

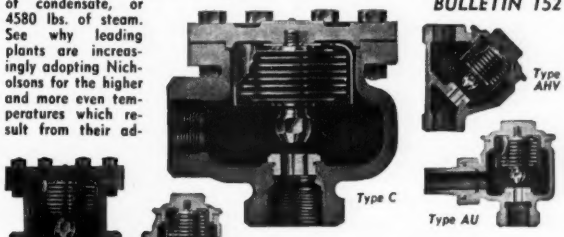
Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco, Spokane and Seattle

NICHOLSON TRAPS

SAVE 4580 LBS. OF STEAM Per CYCLE

A large user of steam on the west coast reports that substitution of Nicholson traps for a mechanical type effected a cyclic saving per dryer of 550 gallons of condensate, or 4580 lbs. of steam. See why leading plants are increasingly adopting Nicholsons for the higher and more even temperatures which result from their advanced features: operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting.

BULLETIN 152



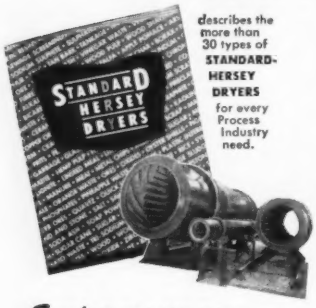
5 TYPES FOR EVERY APPLICATION, process heat, power. Sizes ¼" to 2"; press. to 250 lbs.

193 OREGON ST., WILKES-BARRE, PA.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

Your Guide to
PROFITABLE
DRYING



describes the more than 30 types of **STANDARD-HERSEY DRYERS** for every Process Industry need.

Send FOR YOUR COPY TODAY!

Examples of how Standard-Hersey Dryers make money for their operators. Special features and advantages of Standard-Hersey Dryers, Kilns, Coolers and Calciners. How our "pilot" dryer takes guesswork out of dehydrating problems. Write for Dryer Bulletin 508.

STANDARD HERSEY *Dryers*

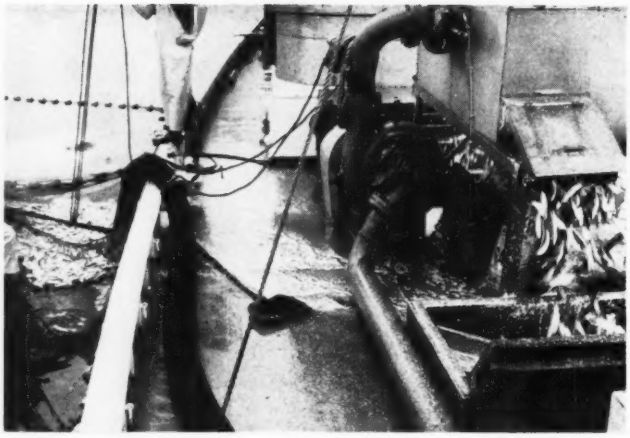
STANDARD STEEL CORPORATION
5045 Boyle Ave., Los Angeles 58
419-45 Commonwealth Ave., Boston 15

the flair
of the
Professional Chef

Perfected and Proved
by the *Snell*
Organoleptic Panel Technic

let us impart
to your foods
zest appeal
packaging perfection
Inquiries Welcomed

RESEARCH LABORATORIES
FOSTER D. SNELL INC.
29 WEST 15-ST. NEW YORK 11, N.Y. — WA 4-8800
CHEMISTS · ENGINEERS



Fish Hosed Into Hold

By using a pump-suction carrier hose, sardines are now zipped from net to boat-hold at 65 tons an hour in this Maine Coast operation. That's a two-hour saving over the net-loading rate. And later, a similar hose whisks the fish to dock in minutes—a job formerly requiring hours of shoveling. Thus sardines get to market sooner, and boats get more time for fishing. The hose is of 6-in. dia. and has a soft rubber lining so fish traveling inside won't be bruised. B. F. Goodrich makes it.

Bans Lifted as Foot-Mouth Is Wiped Out in Mexico

Foot-and-Mouth disease is now reported eradicated in Mexico, and accordingly the import prohibitions, standing since 1946, have been lifted. They had affected cattle, sheep, other domestic ruminants, and swine, also fresh, chilled, and frozen beef, veal, mutton, lamb, and pork.

In line with the new move, abolishment of the Mexican-U. S. Commission for the Eradication of Foot-and-Mouth Disease is announced. However, a small group of workers from both countries will continue greatly reduced activities under the direction of a newly formed Mexican-U. S. Commission for the Prevention of Foot-and-Mouth Disease.

Livestock importation from Mexico will be governed by slightly more stringent regulations than applied before identification of the disease.

Proportion of meat now to come in as live animals is as yet uncertain.

Carton-Material Economies

Notable savings are possible in the use of fiberboard in master containers for shipping prepackaged tomatoes, according to a study by the Fruit & Vegetable Branch, Production & Marketing Admin., USDA.

The most economical 10-trayer among 49 units examined, employed 40 percent less material than the average for containers of that size group. Also, it was noted that some cartons utilized more than three times as much board per tray.

Containers termed best in conserving material are the 1-piece stitched box, the regular slotted box, and the 2-piece half-telescope box. The 1-piece self-locking and the 2-piece full-telescope types were found less economical.

Slayton Heads GIEQ

Appointment of Earle L. Slayton as head of the General Industrial Equipment Division of the National Production Authority is announced.

Mr. Slayton, director of public relations of Cherry-Burrell Corp., Chicago, has attained broad experience in the food processing field over 34 years.

Citrus Ice Creams

A satisfactory way of using orange juice in ice cream has been developed by two scientists at University of Florida.

Big difficulty in the past has been the orange juice's acidity, which prevented its combination with milk products. The scientists have now developed a juice termed compatible with cream when introduced by their special process.

They also report making flavorsome and colorful lime, tangerine, and lemon ice creams by the same method.

(*Turn to page 203*)

Mrs. Tucker's foods get dependable shipments
—plus effective trademark display with

Rheemcote

55-GALLON POSTER DRUMS

PERFECT INSIDE AND OUT!

INSIDE . . . Through constant research, Rheem continues to develop specially prepared container linings for products which cannot be shipped safely in ordinary steel containers. For the manufacturer of new products, Rheem laboratory facilities are fully equipped to test the product and to recommend a suitable lining.

and OUTSIDE . . . Rheemcote containers can be lithographed in any number of colors, any design, including halftones. Decorations like the diagonal stripe on this VELVET drum are possible only with the exclusive Rheemcote process. The high-gloss finish is tough, long-lasting.

Your product . . . your trademark gains extra prestige and new sales opportunities when dramatically presented in Rheemcote drums. Inside and out, Rheemcote offers a sure way to build new customers and new sales. Write for free colorful booklet on this powerful new advertising medium. Rheem Manufacturing Company, General Sales Offices, 570 Lexington Avenue, New York 22, N. Y.

SELL as you SHIP with Rheemcote DRUMS

RHEEM MANUFACTURING COMPANY · *Manufacturing Plants in 22 Cities Around the World*

CALIFORNIA: DOWNEY, NEWARK, RICHMOND, SAN PABLO, SOUTH GATE • ILLINOIS: CHICAGO • LOUISIANA: NEW ORLEANS • MARYLAND: SPARROWS POINT • NEW JERSEY: BURLINGTON, LINDEN • TEXAS: HOUSTON • **FOREIGN PLANTS**—ARGENTINA: BUENOS AIRES • AUSTRALIA: BRISBANE, FREMANTLE, MELBOURNE, SYDNEY • BRAZIL: RIO DE JANEIRO • CANADA: HAMILTON • ITALY: MILAN • PERU: LIMA • SINGAPORE • UNITED KINGDOM: BRISTOL

© 1952 RHEEM MFG. CO.

The cold facts behind Swift's Premium Ham

Swift & Company—long famous for its hams, as well as its other Swift's Premium branded products—keeps things cold with Worthington compressors in its plants at Chicago, Cleveland, Sioux City, St. Joseph, Mo., Georgetown, Del., Mishawaka, Ind., Philadelphia and Jersey City.

Other big meat-packing names who also use Worthington refrigeration equipment are: Armour, Wilson, Morrell, Hormel, and Miller & Hart.

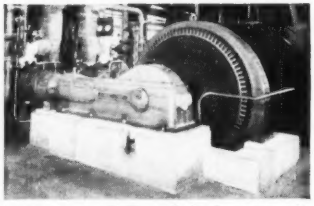
When you call on Worthington for your refrigeration needs, you're assured of the equipment that exactly suits your needs—thanks to the completeness of the Worthington line and its over 100 years' experience with liquid- and gas-handling equipment.

Worthington ammonia compressors, used throughout the meat-packing industry, are available in capacities of 1 to 1,000 tons in *vertical*, *Y* or *horizontal* types. All use Worthington's exclusive Feather* Valves and offer many other features representing the most advanced design in the field.

No other manufacturer makes so complete a line. A Worthington system is all Worthington-*made*, not just Worthington-assembled, for perfect balance in operation and unit responsibility.

Worthington Corporation, Air Conditioning and Refrigeration Division, Harrison, New Jersey.

*Reg. U. S. Pat. Off.



WORTHINGTON horizontal duplex ammonia compressor at Swift & Company's plant in Chicago.

A.2.13

WORTHINGTON

Air Conditioning and Refrigeration

Standard on Flour Units

Now available to bakers is *Sanitation Standard for Flour Handling Equipment*, first in a series being issued by the Baking Industry Sanitation Standards Committee.

In publications to follow, the various other machinery and equipment employed in the field will be similarly individually treated.

The initial standard, of 14 pages, covers flour handling units in 14 sections. General factors, definitions, design, and construction are detailed, followed by specific data on single and multiple compartment dump bins and blenders, storage bins, screw conveyors, bucket elevators, sifters, weigh hoppers, cut-off gates, drag conveyors, and air activated conveyors. A final section concerns installation.

Priced at 25c., copies may be obtained from the Committee at 511 Fifth Ave., New York City 17.

Hors d'Oeuvres

► **Everyone in the area is up in arms about the Brannan plan to locate the hoof-and-mouth disease lab on Plum Island. They say Brannan is Plum wrong—again.**

► The world is producing only 4,800,000 tons of rice for export instead of the 9,000,000 tons needed. Looks like they'll have to throw gravel at weddings.

► **Consumers spent more than $4 billion for distilled liquor. $4½ billion for beer, and only $500 million for wine last year. Americans never do anything half-way. Either the drink is dynamite or a thirst quencher—seldom the convivial happy medium.**

► It's not true, says Guinness—that newspaper statement that licorice gives the famous brew its color and flavor. 'Tis roasted premium barley. And no insult intended to candy manufacturers.

► **More than 80 percent of the stores now sell Brown-'N-Serve bakery products, General Mills reports. In 1949 we predicted a great future for this accidental innovation. Does that make us a half-baked authority?**

► Want a new product idea? Might make concentrated milk paste. The Tartars produced it in 1300 A.D. But they won't sue you for patent infringement.

► **Farmers could produce 18 percent more food if necessary, says USDA. Is this with or without the Brannan give-away program?**

► Heavy hot-weather demand recently wiped out stocks of frozen concentrated lemonade in the New York metropolitan area. Brewers and beverage bottlers beware!

FLEXIBLE STEEL CONVEYOR BELTING

No Creep • No Weave • No Jump

Whether it's canning, freezing, dehydrating, or any other food processing operation, this rugged La Porte Flexible Steel Conveyor Belting will serve you better with lower maintenance cost.

STEEL MESH CONSTRUCTION protects against loading impacts. FLEXIBILITY FEATURE allows belting to gain a tighter grip on the friction drum . . . puts an end to creeping, weaving, jumping—thus, it assures a perfectly flat surface for containers, empty or filled. OPEN MESH provides circulation or air and liquids around products in process and makes cleaning faster and easier. Highly resistant to heat, cold and steam. Find out how La Porte can increase *your* food processing efficiency.

Available in any length and practically every width.
Write your dealer TODAY for literature and prices!

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

LEE *headquarters for the Standard and Special Designs*

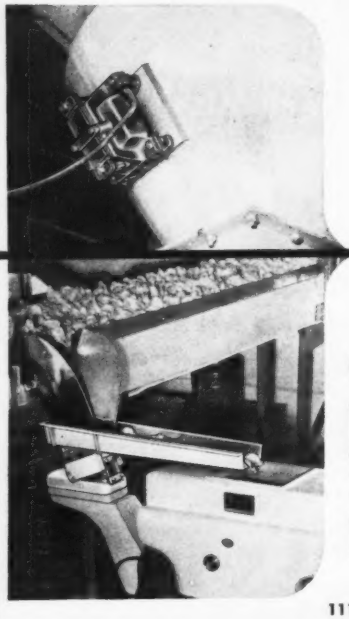
CORROSION-RESISTANT
KETTLES

Available in sizes up to 500 gallon capacity to meet every processing need. Easy to clean and keep clean, they are practical and meet all sanitary regulations. All Lee kettles are available with hydraulic cylinders where your own water line provides the necessary operating power to safely control tilting kettles and tilting agitators in agitator kettles.

Our new descriptive bulletins sent on request.

LEE METAL PRODUCTS CO., INC.
416 PINE STREET, PHILIPSBURG, PA.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE



SYNTRON

BIN VIBRATORS and VIBRATORY FEEDERS

Speed Up Your Processing of Bulk Foods!

PROVIDE efficient handling with variable control of power and rate of flow, of most all types of dry or damp bulk foods.

Write For Your Free Copy of Syntron Catalog Number 519

SYNTRON CO.

111 Lexington Ave., Homer City, Pa.

Reduce Mixing Time... Improve Product Quality...

with the

"ENTOLETER"

HIGH SPEED

MIXER

Write for latest descriptive Bulletin.

ENTOLETER DIVISION, The Safety Car Heating and Lighting Co., Inc., P. O. Box 904, New Haven 4, Conn.

ENTOLETER CENTRIFUGAL MACHINES

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Checklist of U. S. Standards for Grades of processed fruits and vegetables (canned, dried, and frozen), as of Aug. 1, has been issued by Processed Products Standardization & Inspection Division, Fruit & Vegetable Branch, Production & Marketing Administration, USDA, Washington 25, D. C. Copies of the checklist or any of the standards listed may be secured on request to that address.

Pork carcasses and swine, new, page 7363, Aug. 13 *Federal Register*, effective Sept. 12.

Florida grapefruit, new, page 7408, Aug. 15 *Federal Register*, effective Sept. 14.

Shelled almonds, revised, proposed, page 7435, Aug. 15 *Federal Register*, written comments received until Sept. 14.

Florida oranges, new, page 7879, Aug. 29 *Federal Register*, effective Sept. 28.

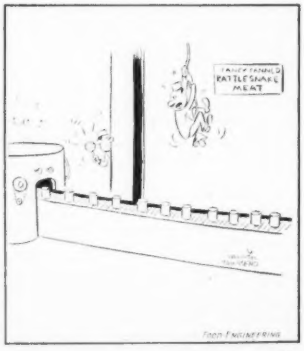
Yeast Spoils Canned Fetta

Australian food technologists have traced spoilage of canned Fetta cheese to osmophillic yeast, which is capable of growth in salt concentrations as high as 18 percent.

Spoiled cans were swollen, and the cheese gave off a putrid, fruity odor. Salt concentration in the whey-brine, in which the product was packed, had fallen from the original 20 to 10 percent.

Prepackaging Costs Gaged

Charges assignable to prepackaging, in terms of labor and materials expended in vegetable and fruit operations, have now been studied on a



pilot-plant scale by Marshall R. Godwin, N. Y. State Agricultural Experiment Station, Ithaca.

An average of 2.4 min. of labor was found required to put up a consumer package. And the average cost of packaging vegetables in film bags ran 4.5c. per unit, of which amount 1.5c. went for materials and 3c. for labor.

For packaging vegetables in wrapped containers, average cost was 5.2c., with 1.5c. going for the container, 0.9c. for the wrapper, and 2.8c. for labor.

Cost of putting up fruits in overwrapped containers was 4.8c. per unit, with labor costs running 2c. and containers 1.9c. each.

Weight losses amounted to one-third of the total volume of produce handled through the packaging plant. Average weight losses were about 40 percent for vegetables and 4.5 percent for fruits.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early September is reviewed below:

Court Actions

Another *bread* emulsifier petition has been filed, this time in Eighth Circuit U. S. Court of Appeals in St. Louis by Research Products Co. of Kansas City, Mo.

This latest filing, which came just before the Aug. 13 effective date of the new bread standard, is expected to provide another court review of the bread emulsifier provisions, supplementing the hearings expected to get under way in early October in Philadelphia as a result of the Atlas and Glyco petitions there in the Third Circuit Court.

Margarine standard has also been appealed (in the Second Circuit Court in New York by Richard S. Reade). Rejection of the standard's provision for synthetic vitamin A and pro-vitamin A has been sought in this petition.

Future Hearings

1. *Salad dressing*, rehearing, standard of identity; "skim milk and milk products proposed as optional ingredients. F&DA gathering data; no hearing date set yet.

2. *Process cheese food*, amendment, standard of identity; skim milk cheese proposed as optional ingredient. Hearing expected soon, but date not set yet.

3. *Canned tuna*, hearing expected during winter but no date set yet; initiative of Administrator.

4. *Frozen vegetables*, hearing ex-

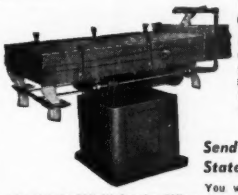
Send us a sample of any stock you want to PULVERIZE

You will receive an Engineering Report based on our Test Grind with the

SCHUTZ-O'NEILL PULVERIZER

Do you have a production problem on stocks you grind, to get desired uniformity or fineness? Are you looking for increased output with a cost reducing method? Profit by Schutz-O'Neill's experience of almost 60 years in the rapid, dustless, accurate pulverizing of any dry, non-gritty, grindable stock. Your acceptance of this offer for a test grind does not obligate you. Schutz-O'Neill pulverizers are made in 6 sizes with capacities up to 3000 lbs. per hour.

Catch tramp iron or steel with a Schutz-O'Neill SUPER-MAGNET
Standard equipment on feeders for Schutz-O'Neill Pulverizers.



The Schutz-O'Neill Gyrator Sifter turns out a large volume of uniform, clean products. 1 to 3 sieve frames for single or multiple separation.

The finest development of Centrifugal air-force pulverizing

For extremely fine grinding and uniformity of product, the principle of centrifugal impact with product carried by the air stream, has never been surpassed. Schutz-O'Neill Pulverizers utilize this principle to the fullest degree.

Send us stock sample
State fineness desired

You will receive your pulverized stock plus our Engineering Report giving recommended equipment, methods and mill plans. Literature upon request.

ESTABLISHED 1893 SCHUTZ-O'NEILL CO.
PULVERIZERS · BRENNER MILLS · BULLER MILLS · BURR MILLS · HAMMER MILLS
309 Portland Ave. Minneapolis 15, Minnesota

Save a Girl on Every Line

Use a ROLACODER to Mark Code-Dates, Brands, Lot Numbers on Packages *Automatically*

Attach a compact ROLACODER Imprinter to a sealer, packaging machine or conveyor and let it mark your cartons for just a few cents a day. Eliminate labor cost for rubber stamping or stencilling . . . get neater, cleaner, more accurate marking. Friction-operated, self-inking. Copy changes made in minutes. Models to imprint top and sides of every kind of package.

Write for descriptive brochure ROL-1

ADOLPH GOTTSCHO, INC., HILLSIDE 5, N. J. Gottscho

• Machines to Mark Whatever You Make •

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

No. 1800 DETECTO-GRAM INDICATOR HEAD

One more Detecto weighing instrument to speed production. This attachment converts your present beam scales to accurate weighing equipment. Indicator stops instantly at correct weight.

Write for Catalogue

DETECTO SCALES • INC.

MAKERS OF FINE SCALES SINCE 1900

548S PARK AVENUE • BROOKLYN 5, N. Y.

SCALE ENGINEERS IN ALL PRINCIPAL CITIES

OPERATION *Acid-Proof*

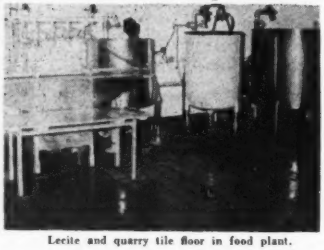
ends your CORROSION troubles for keeps!

Borrowed from military parlance, the term: "Operation Acid-proof" describes construction of and service rendered by EL CHEM food plant floors.

EL CHEM Floors are SANITARY —

- are proof against acids and alkalis, including cleaners
- proof also against steam, hot water, oils, fats and greases—easily cleaned
- withstand severe traffic and abrasion
- serve for years without need of repair
- are too dense to permit food penetration or bacterial growth
- prevent corrosion threats to your building structure

Your EL CHEM Floor is constructed by laying an impervious membrane over the concrete subbase. This membrane is protected by acid-*proof* brick or tile, joined with Lecite cement • Complete service, including materials and supervision, or complete responsibility • Our engineers will survey your corrosion problem, make recommendations and prepare plans and estimates—without obligation. Write today for technical literature.



Lecite and quarry tile floor in food plant.

ELectro CHEMical ENGINEERING & MANUFACTURING CO.

756-A BROAD STREET • PENNSYLVANIA

Manufacturers of acid and alkali-proof cements, linings and coatings since 1912

Schedule of Events

October

10–11—American Assn. of Cereal Chemists, annual Tri-Section meeting; Kansas State College, Manhattan, Kan.
13–16—Technical Short Course, Society of Industrial Packaging & Materials Handling Engineers; Chicago.
14–16—Society of Industrial Packaging & Materials Handling Engineers, annual exposition; Coliseum, Chicago.
16–17—National Pickle Packers Assn., annual meeting; Blackstone Hotel, Chicago.
20–22—American Oil Chemists' Society, fall meeting; Netherlands-Plaza Hotel, Cincinnati, Ohio.
20–22—Packaging Institute, annual forum; Hotel Commodore, New York City.
20–24—National Safety Congress & Exposition, Conrad Hilton, Congress, Morrison, Sheraton, and LaSalle Hotels, Chicago.
22–25—National Bakery Suppliers Assn., annual convention; Drake Hotel, Chicago.
26–28—National Pretzel Bakers Institute, annual convention; Netherland-Plaza Hotel, Cincinnati, Ohio.
27–30—American Gas Assn., annual convention; Atlantic City, N. J.
5– 7—Industrial Management Society, annual Time & Motion Study and Management Engineering Clinic; Sheraton Hotel, Chicago.

November

10–12—Grocery Manufacturers of America; New York City.
11–13—Southern Assn. of Ice Cream Manufacturers, annual convention; Jung Hotel, New Orleans, La.
16–21—Master Brewers Assn. of America; annual convention; Jung Hotel New Orleans, La.
17–20—American Bottlers of Carbonated Beverages, annual meeting, and International Beverage Exposition; Auditorium, Atlantic City, N. J.
19–21—Dairy Manufacturers' Short Course; Texas Technological College, Lubbock, Tex.

December

1– 6—National Exposition of Power & Mechanical Engineers; Grand Central Palace, New York City.
4– 5—Tri-State Packers Assn., annual convention; Atlantic City, N. J.
8–11—National Coffee Assn., Boca Raton, Fla.

pected next year; initiative of Administrator.

Hearings in Progress

Ice cream standard of identity moved into its final phase after Labor Day, with the cross examination of witnesses on the effects (harm or harmlessness) of surface-active agents. A few miscellaneous items may follow this part of the hearing before adjournment.

Tentative Orders Awaited

1. *Residue tolerances*, on fresh fruits and vegetables, new. Expected soon; hearing adjourned Sept. 1950; briefs filed Dec. 1950.

2. *Canned pineapple and canned pineapple juice*, new, standards of identity, quality, and fill of container. Expected during latter part of 1952; hearing adjourned in April; briefs were due Sept. 15.

Final Orders Awaited

Frozen fruits, new, standards of identity and fill. Expected very soon; tentative order published in Oct. 1950; exceptions filed in Jan. 1951.

Standards Completed

Canned mushrooms, amendment, standards of identity and fill, page 8176, Sept. 11 *Federal Register*, effective Dec. 10. The new standard permits restricted amounts of ascorbic acid, water, and salt as optional ingredients. Citric acid has been ruled out in the amended standard because of its bleaching effect. The standard of fill follows present trade practice and is based on drained weight.

—*End*—

Safety After 5 O'Clock

—*Continued from page 94*

formation. Our program includes home-and-highway-safety material for house organs.

8. To maintain interest through incentives: Inter-group competition is recommended—with appropriate recognition to the group with the best off-the-job safety record. And to keep the entire family interested, the plan provides for scholarship essay competition among employees' children on the subject "What We Have Done to Make Our Home Safer."

9. To facilitate orderly investigation of accidents: A special investigation form has been prepared. It serves the important purpose of disclosing accident sources and causes.

Where To Get It? Cost?

Where can off-the-job safety material be obtained?

Most of it is readily available from the National Safety Council, several life insurance companies, and many casualty companies.

As a coordinated whole, the material —organized in program form—is available from the American Mutual Liability Insurance Co., 142 Berkeley St., Boston 16.

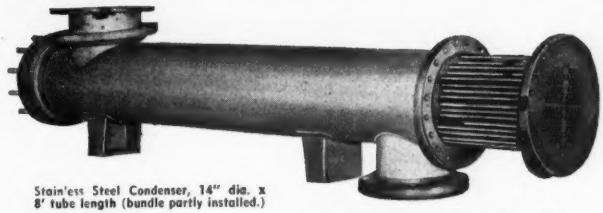
What about the cost?

Estimates of costs for furnishing the material to support such a program vary greatly, depending upon source, number of employees to be served, and frequency of issue of material. But

DOWNINGTOWN IRON WORKS INC.

We are specialists in

HEAT TRANSFER EQUIPMENT



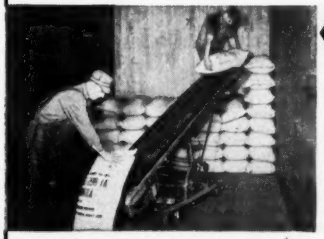
Stain'ess Steel Condenser, 14" dia. x 8' tube length (bundle partly installed.)

DOWNINGTOWN solicits your inquiry for Heat Transfer Equipment fabricated of Aluminum, Inconel, Nickel, Phosphor and Aluminum Bronze, Copper, Stainless, Monel, Silicon Bronze and various grades of Carbon Steel.
Design and construction will meet requirements of A. S. M. E. Code or other agency specified by customer. Equipment of our design is sold on a guaranteed performance basis or we will fabricate to customer's drawings. Modern facilities available for radiographing, stress relieving and heat treating, where required.
Remember: "Your Needs Are Our Specialty!"
DOWNINGTOWN is experienced in building equipment with Bi-metallic, Finned Tube and Karbate Graphite.
Write on your letterhead for **DOWNINGTOWN** literature on shell and tube heat exchangers.

DOWNINGTOWN IRON WORKS, INC.
DOWNINGTOWN, PA.
STEEL & ALLOY PLATE FABRICATION
HEAT EXCHANGERS

NEW YORK OFFICE: 30 CHURCH STREET

MODERN TIME AND COST SAVERS BUILT BY... *Standard* GRAVITY & POWER CONVEYORS

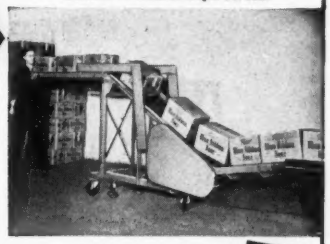


FASTER HANDLING IN SHIPPING ROOMS...With the HANDIBELT

Conveys bags, cartons, boxes horizontally or at any decline and incline angle within its range. Easily wheeled about by one man—easy to adjust and use — fits in crowded aisles, cars and freight elevators. Handles packages up to 135 lbs. TWO SIZES: No. 11 Handibelt, 11 ft. long, piles to 7 ft. 6 in.; No. 16, 15 ft. 9 in. long piles to 10 ft. 6 in. Write for HANDIBELT Bulletin — address Dept. FE 102.

FASTER PILING IN WAREHOUSES ...with the HANDIPILER

For loading, unloading, stacking and elevating sacks, boxes, cases, and cartons. Adjustable boom reaches to rear of storage piles or far into cars, trucks, trailers. Reversible apron — conveys commodities up or down. Piles to 17 ft. — handles packages up to 100 lbs. Saves lifting — carrying — cuts handling time in half. Write for HANDIPILER Bulletin—address Dept. FE 102.



STANDARD CONVEYOR COMPANY
General Offices: North St. Paul, Minn.
Sales and Service in Principal Cities.

Send for Standard Bulletin No. 65-B describing gravity & power conveyor units. Address Dept. FE 102.

Guard Against Atmospheric Hazards...

WITH

Century

PROTECTED MOTORS

Drip Proof

Splash Proof

Totally Enclosed Fan Cooled

Explosion Proof

Century Electric Company is celebrating its 50th year in the electrical industry.

Century Motors

ALTERNATING CURRENT MOTORS

POLYPHASE

Squirrel Cage Induction—1/6 to 400 H.P.
Wound Rotor Motors—1 to 400 H.P.
Synchronous Motors—20 to 150 H.P.

SINGLE PHASE

Split Phase Induction—1/6, 1/4, 1/3 H.P.
Capacitor—1/6 to 20 H.P.
Repulsion Start, Brush Lifting, Induction—1/2 to 20 H.P.

DIRECT CURRENT MOTORS

1/6 to 300 H.P.

GENERATORS

AC, .63 to 250 KVA
DC, .75 to 200 KW

GEAR MOTORS

1/8 to 1-1/2 H.P.

MOTOR GENERATOR SETS

AC to DC, AC to AC
DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof.

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

CE-673

To guard your production against the destructive effects of atmospheric hazards, Century offers four types of protective motor frames.

DRIP PROOF—meets the requirements of most installations. Use it where operating conditions are relatively clean and dry. Top half of the frame is enclosed to keep out falling solids and dripping liquids.

SPLASH PROOF—keeps splashing liquids out of the motor even when the frame is washed with the full force of a hose. Use Century Splash Proof motors indoors or outdoors.

TOTALLY ENCLOSED FAN COOLED—resists the hazards of abnormal concentrations of dusts, powders, grit, oil mists, acid and alkali fumes.

EXPLOSION PROOF—protects life and property in atmospheres charged with explosive dusts or vapors.

The properly selected protection with the wide variation of starting torque characteristics to choose from provides long operating life and improves the production of the driven equipment.

Century motors are available in a wide range of kinds and types—in sizes from 1/6 to 400 horsepower—for single phase, polyphase and direct current applications.

Specify Century motors for all your electric power requirements.

CENTURY ELECTRIC CO. 1806 Pine St. • St. Louis 3, Mo.
Offices and Stock Points in Principal Cities

tests demonstrate that a result-getting program can be supplied with material within a budget of $1 per family, per year.

The whole objective of this program simply is this: To make living safer for people, and people safer for living.

When management will pave the way for such a program—and employees do all in their power to cooperate to achieve such a result—the benefits to be derived by each are great.

End (Resume reading on page 95)

Frozen Juice in Bags

—Continued from page 75

Each cell holds 12 packages, totaling 72 for the carton.

But the company is changing over to a random pack, inasmuch as it cannot interest any manufacturer in designing automatic cartoning machinery. This new carton has a corrugated liner into which 96 packages are weighed and dumped as the carton is shaken.

Shipped in refrigerated trucks and rail cars to Walgreen freezer-storage rooms in headquarters cities, the product is delivered to 400 retail stores in the low-temperature trucks that carry ice cream. Three cartons are placed on end in a two-can ice cream compartment to keep the concentrate frozen until served.

Squeezing and Serving

And at this point, the benefits of more ingenuity come into play. Walgreen devised a gadget to empty the concentrate from each envelope and make it into a 10-oz. glass of tasty juice.

Center-cut with a knife along the word "concentrated", the envelope halves are folded back and placed into an easily cleaned stainless steel cup with a perforated bottom. Then a hand-operated plunger squeezes the contents from the bag and into a stainless steel beaker with a high-speed agitator in the bottom.

At the press of a button, the agitator revs up, and the correct amount of reconstituting water is metered automatically into the beaker. In just 6 sec., you have orange juice—with controlled aeration. Then the machine cuts off automatically, and the juice is served.

From ice cream cabinet to customer takes but 13 sec. Slide-rule that into fraction-of-a-cent labor and compare it with this figure: With fresh oranges, it takes 7 or 8c. worth of labor to serve a glass of juice.

Now add these advantages:

1. Peels, slop, and bulky fresh-fruit handling and storage are eliminated.

2. There is no holding of the squeezed juice in stirring vessels, no dilution nor deterioration of flavor or vitamin content.

3. The new method is sanitary.

4. Customers like the new way better.

More than 1,500 glasses of the new-way juice were sold in a Houston store on the first day. A Chicago loop store dispensed 3,000 over a week-end.

Savings to Walgreen are calculated to have paid off already the cost of developing and installing the new counter machines.

One can scarcely deny the future of this development. Pasco will supply Walgreen all that the big chain can use before other organizations are sold. To give you some idea: Last year this chain served 12 to 13 million 6-oz. glasses of orange juice. And those store fountains which have the new 10-oz.-for-15c. serving made from concentrate are averaging four to five times as many servings as with fresh juice.

When Walgreen is taken care of, Pasco plans to expand to other drug chains and variety stores. To up production, it will increase the number of packaging machines to 8 or 10.

Nothing has been said about sales to housewives, but the new package also looks like a natural for home use by small families.

What About the Cost?

Since the operation is new and a radical departure from Pasco's canning operation, labor costs are substantially higher than for the 6-oz. can. The usual can line operates at filling and sealing speeds of 425 a minute, with 1 operator on the closing machine and 1 on the caser and sealer. The 2½-oz.-envelope line requires 9 men for the 100-per-minute speed.

So labor costs are about 25 times as much, although they are being reduced substantially as the operation is ironed out. For example, the random packing technique will save 6 men per shift, or 18 a day.

But wait. Compared with tin cans, the flexible packages cost less than half as much, volume for volume. So total cost per ounce, on a 100,000-bag-per-day-per-machine basis, is only slightly higher than that of the regular concentrate in cans.

Yes there is a future in this operation.

End (Resume reading on page 76)

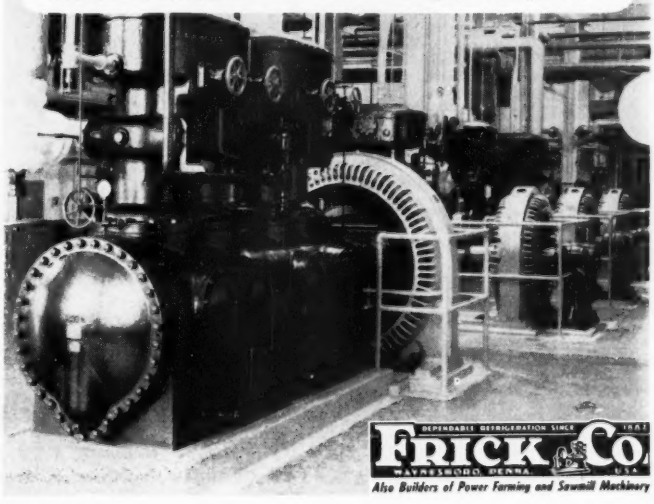
FRICK Refrigeration Serves Lucky Lager Brewing Co.

This Brewery in Los Angeles County, California, one of the finest in the country and one of three Lucky Lager Breweries on the Pacific Coast, uses four large Frick ammonia compressors with unusual reliability and economy in producing 700,000 barrels of beer annually.

Installation by Eckert Engineering Co., Frick Distributors at San Francisco.

For the answer to your air conditioning, quick-freezing, ice-making or refrigeration problems, look to

FRICK COMPANY • Waynesboro, Penna.

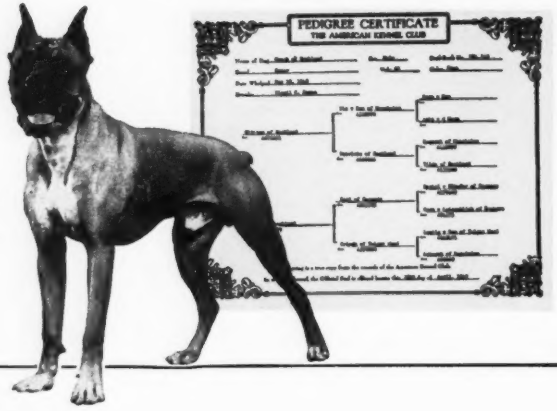


DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery



THE BOXER, America's No. 1 favorite for 1949, gets his name from the fact he uses his front paws in much the same way as a human boxer when fighting. Coloring of coat ranges from fawn to brindle, but his muzzle is always black.

Buyers Who Know

Look at the Pedigree

THE UNION SHIELD is the pedigree mark of a box with 75 years of packaging leadership behind it.

That's why Standard Brands uses Union boxes to carry Royal Puddings —choice of millions—to dealers all over the country.

The Union shield means every step in the making, from tree to finished box, is tested and controlled by one management in America's largest integrated pulp-to-container plant.

Three modern box plants, five of the world's largest paper machines, and vast timber tracts are your guarantee of consistent quality, consistent service and fair price, today and in the future.

That's why every month more makers of famous brand products are shipping in Union boxes.

TRADE MARK UNION

Dependable Packaging Since 1872

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

Recent Inventions

PRODUCTS

Sterilized Cream in Sealed Containers Made by Evaporating, Blending With Primary Cream, Separating to a Desired Fat Content, Sterilizing in Sealed Containers—*V. Nelson. to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,603,568. July 15, 1952.*

Effervescent Beverage Concentrate Comprising Mixture of Organic and Inorganic Acid Disaccharide Complex—*J. G. Alther, Evanston, and P. M. Van Arsdell, Chicago, Ill. No. 2,603,569. July 15, 1952.*

PACKAGING

Apparatus That Fills Containers to Heaping Level, Then Shakes Each Down to Settle Fill and Eject Excess—*H. Hansen, to Fewel Bros. Packing Co., Fresno, Calif. No. 2,601,944. July 1, 1952.*

Hopper Equipped With Means for Accurately Filling Containers in Food Packing Machines—*E. H. Carruthers, Warrenton, Ore. No. 2,602,579. July 8, 1952.*

PROCESSES

Refining Soybean Lecithin by Extraction With Material From 2-Methoxy Ethanol and 2-Ethoxy Ethanol, Then Removing Extract From Residue—*H. O. Renner, Des Plaines, Ill. to J. R. Short Milling Co., Chicago. No. 2,599,016. June 3, 1952.*

Producing Pineapple Juice Suitable for Blending by Extracting Skin With Grapefruit Juice and Recovering—*J. L. Parker to Prime Products, Inc., Tampa, Fla. No. 2,599,476. June 3, 1952.*

Treating Sugar-Containing Liquids in Cation Exchange Bed With High Deashing Capacity, Followed by Cation Bed With Higher Refining Capacity, Both Operating in the Hydrogen Cycle—*J. B. Gottfried, Chicago to Corn Products Refining Co., New York. No. 2,599,757. June 10, 1952.*

Clarifying Wines by Passing Through Cation Exchange to Replace Potasium Ions in Tartrate, Converting Tartrates to Tartaric Acid, Filtering—*J. C. van Dyk to The Product Developers Inc., Bernardsville, N. J. No. 2,600,085. June 10, 1952.*

Producing Cereal Food by Cooking to Form Moist Mass, Sheeting, Perforating and Superimposing Sheets, Segmenting to Form Hollow Pillow-Like Bodies and Heat Puffing—*D. Hale, University City, Mo. and E. J. Carpenter, Battle Creek, Mich. to Ralston Purina Co., St. Louis. No. 2,600,532. June 17, 1952.*

Controlled Dielectrically Heating of Packaged Frozen Foods by Use of Conductive Shielding—*F. W. Moffett, Jr., Chili, New York. No. 2,600,566. June 17, 1952.*

Treating Shrimp by Immersing in Highly Saline Liquid, Heating in Water, Rapidly Cooling in Icy Liquid, Draining—*K. C. Envoldsen, Cleveland, Ohio. No. 2,600,627. June 17, 1952.*

Dressing Poultry by Subjecting Carcass to Liquid Bath Treatment, Then Severing the Trachea at a Point Posterior to the Larynx—*C. H. Koonz to Swift & Co., Chicago. No. 2,600,781. June 17, 1952.*

Separating Shells and Meat of Shellfish by Crushing to Disintegrate Shell and Soft Meat, Mixing With Water, Decanting to Remove Shell—*D. J. Gerritsen, Eindhoven, Netherlands to Hartford National Bank & Trust Co., Hartford, Conn. No. 2,600,867. June 17, 1952.*

Determining Color of Egg Yolk Products by Mixing With Water-Soluble Electrolyte and Glycerol to Produce Transparent Product, Then Comparing to Color Standard—*E. Selz to The Emulsol Corp., Chicago. No. 2,601,173. June 17, 1952.*

EQUIPMENT

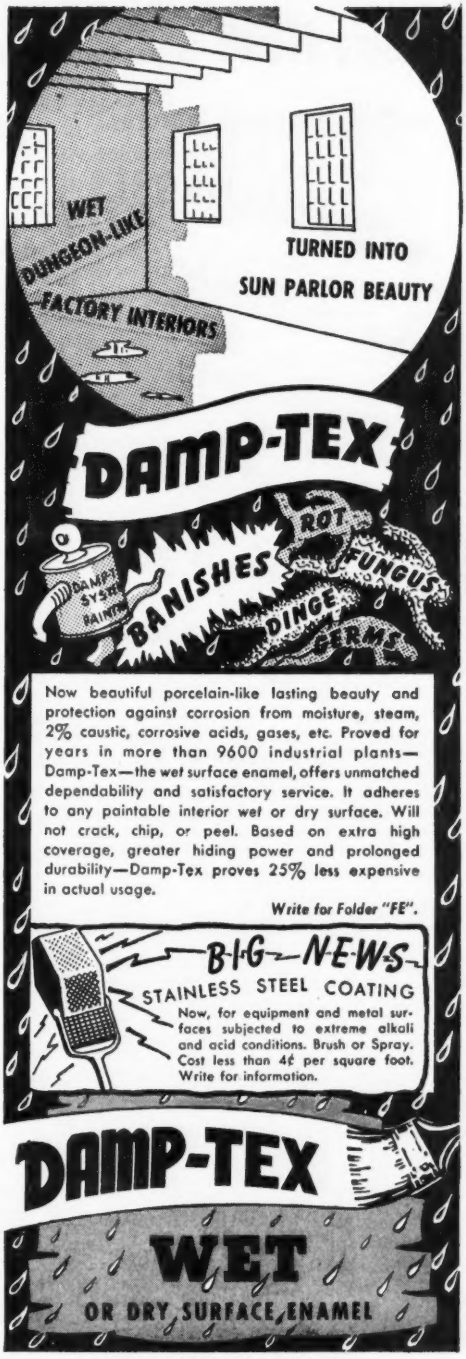
Multiple Grain Scalping Machine With Rotating, Parallel Cylindrical Screens—*A. H. Shepardson, Minneapolis, to Haaky Mfg. Co., St. Paul, Minn. No. 2,597,390. May 20, 1952.*

Apparatus for Cleaning Surfaces of Cans Utilizing Laterally Spaced Rotating Cleaning Brush and Moving Roll—*A. M. Olson, Wauwatosa, Wis., to Chain Belt Co., Milwaukee, Wis. No. 2,597,946. May 27, 1952.*

Conveyor Apparatus Comprising Pair of Spaced Adjacent Rolls With Varying Pitches to Move Objects Through Trough in Non-Rectilinear Fashion—*O. Grosvenor, Morrison, Ill., to Libby, McNeill and Libby, Chicago. No. 2,597,930. May 27, 1952.*

Grain Puffing Machine Comprising Periodically-Fired Automatically-Actuated Rotating Gun—*R. H. Ernest, Akron, Ohio, to The Quaker Ots Co., Chicago. No. 2,598,242. May 27, 1952.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.


WET
DUNGEON-LIKE
FACTORY INTERIORS
TURNED INTO
SUN PARLOR BEAUTY
DAMP-TEX
DAMP SYSTEM PAINTS
ROT
FUNGUS
BANISHES
DINGE
GERMS
Now beautiful porcelain-like lasting beauty and protection against corrosion from moisture, steam, 2% caustic, corrosive acids, gases, etc. Proved for years in more than 9600 industrial plants—Damp-Tex—the wet surface enamel, offers unmatched dependability and satisfactory service. It adheres to any paintable interior wet or dry surface. Will not crack, chip, or peel. Based on extra high coverage, greater hiding power and prolonged durability—Damp-Tex proves 25% less expensive in actual usage.
Write for Folder "FE".
BIG NEWS
STAINLESS STEEL COATING
Now, for equipment and metal surfaces subjected to extreme alkali and acid conditions. Brush or Spray. Cost less than 4¢ per square foot. Write for information.
DAMP-TEX
WET
OR DRY SURFACE ENAMEL

STEELCOTE MFG. CO., St. Louis 3, Mo.
Canadian Manufacturer
STANDARD PAINT & VARNISH CO., WINDSOR, CANADA
Canadian Industrial Distributor
G. H. WOOD & CO., LTD., TORONTO

For more information, use post card on last page.

Something **NEW** in pressure regulators

— with improved features!

SYLPHON No. 991

- Large size 2-ply Sylphon Bellows for added power
- Steady pressure—no drift or build-up
- All-metal—plus stainless steel frame for strength and extra corrosion resistance
- Improved stem packing
- Space-and-weight-saving
- Self-operated—no pilots or pistons

REGULATOR NO. 991, illustrated—valve sizes from ¼" to 1½", inclusive. Maximum initial pressure 150 lbs. Reduced pressure, 5 to 55 lbs. Regulator No. 992 (not shown)—valve sizes ¼" to 4" inclusive. Maximum initial pressure 250 lbs. Reduced pressure ranges: 2 to 25 lbs.; 3 to 40 lbs.

● This new Sylphon Pressure Regulator No. 991 can do a better job than ever in solving pressure problems for you—in steam, air, gas, oil or water lines.

It can be used as an automatic regulator for reducing from high to low pressure . . . or to insure a constant pressure when fluctuating supply pressure is encountered. It may also be used as a "bellows motor" control valve in pneumatic or hydraulic control systems.

When equipped with proper valve, it can be used as pressure relief valve (Regulators Nos. R-991, R-992) to protect other equipment against excessive pressures by bleeding-off or by-passing medium involved.

Like all Sylphon Regulators for pressure or temperature, it is built to give you years of trouble-free service. It's sturdy—compact—neat—never requires more than simple, routine inspection or servicing.

Find out how Sylphon Regulators 991 or 992 (not shown) can help assure you better pressure control . . . better performing equipment . . . better, more economical operations. Write for Catalog TG-100.

FS

FIRST WITH BELLOWS

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

Canadian Representatives, Darling Brothers, Montreal

Apparatus for Continuously Transforming Barley Into Malt Comprising an Elongated Soaking Channel Leading to Vertical Dry Steeping Chamber Under Suction to Remove CO_2—O. A. Skantze, Falkenberg, Sweden. No. 2,598,313. May 27, 1952.

Fruit Juicing Apparatus With Chamber and Reservoir Leading Therefrom Under Vacuum—E. R. Odum, Altadena, and H. T. Lannen, to Air Line Engineering Corp., Pasadena, Calif. No. 2,598,418. May 27, 1952.

Apparatus for Treating Cereal Grains Consisting of Two Steam-Jacketed Rotating Vessels Connected in Series by Common Steam Header and Common Blowoff Pipe With Means for Introducing Wet Steam Into One Vessel—E. G. Huzenlaub, Chicago and F. H. Rogers, Elmhurst, Kenley, England to Converted Rice Inc., Houston, Texas. No. 2,598,915. June 3, 1952.

Three-Roll Sugar Mill Housing With Adjustible Bearing Blocks for Compensating Wear on Roller Surfaces—C. Provost, Jeanerette, La. No. 2,599,125. June 3, 1952.

Continuous Sugar Juice Clarifier Employing Annular Channel Betweeen Plurality of Vertically Spaced Trays Inside Cylindrical Tank—L. M. I. Rodriguez, Havana, Cuba. No. 2,599,782. June 10, 1952.

Apparatus for Removing Outer Layers From Hard Kerneled Grains Comprising Horizontal Cylindrical Tooth-Equipped Rotor in Screen Enclosed Balance Chamber With Inlet and Outlet Openings—R. H. Brown, Beckenham, England to W. E. Moulsdales and Co., Ltd., London, England. No. 2,599,892. June 10, 1952.

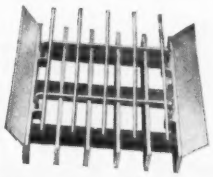
Apparatus for Making Edible Food Product Chips Employing Rotating Heated Drums for Forming Dough Sheet With Cutter Bars Below to Slice it Into Ribbons and Then Chips—G. J. Campbell, Miami, Fla. No. 2,599,894. June 10, 1952.

Apparatus for Feeding Parallel Rows of Candy Bars Along Horizontal Path in Spaced and Timed Relation—S. G. Petrilli to General Candy Corp., Chicago. No. 2,599,937. June 10, 1952.

Whipping Device for Ice Cream Softening Machine Employing Rotating Tines to Engage Body of Hard Ice Cream Placed Within Machine—M. C. Luterick, Montrose, Calif. to Arden Farms Co., Los Angeles. No. 2,600,009. June 10, 1952.

Automatic Doughnut Former Employing Pneumatic Pumping System and 4-Way Valve Serving Extrusion Chamber—E. J. Roth, Rockleigh, N. J. to Joe Lowe Corp., New York. No. 2,600,075. June 10, 1952.

you can't drop a nail through this grate



Climb up high and drop a steel nail on this magnetic grate. Or throw nail as hard as you can against it. The nail simply can't get through.

It's obvious that the nail or other iron or steel piece will first strike a grid wire or a grate bar. That will check the momentum. Then the object will be caught with a strong magnetic grip.

The Bauer Magnetic Grate is laid on a frame in a hopper throat or floor opening to catch all steel and iron inclusions in flowable materials—grain, nuts, seeds, fruits, coffee, tea, spices, sand, clay, lime, chemicals. The grates work well in liquids, too.

Ask for Bulletin M-3-A which fully describes the magnetic grate and other Bauer Magnetic Separators.

THE BAUER BROS. CO.

1719 Sheridan Ave. • Springfield, Ohio

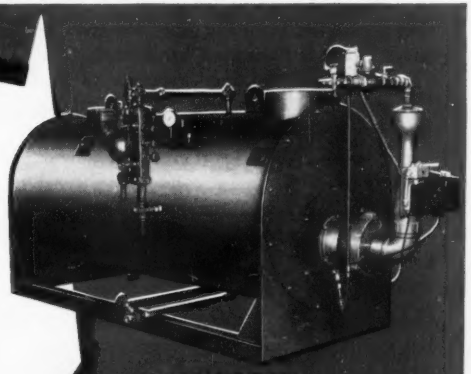
in SURFACE and SERVICE

you get more in the new, improved

Steamaster

"LITTLE SCOTCHMAN" BOILER

Even thriftier operation, now, because the heating surface has been increased up to 20%! That means better boiler efficiency — more steam for your fuel dollar, whether your "Little Scotchman" uses gas or oil firing. For gas, a new burner arrangement provides the most complete and efficient combustion. Get the facts and you will surely get the "Little Scotchman" for new economy, new operating convenience in your plant.

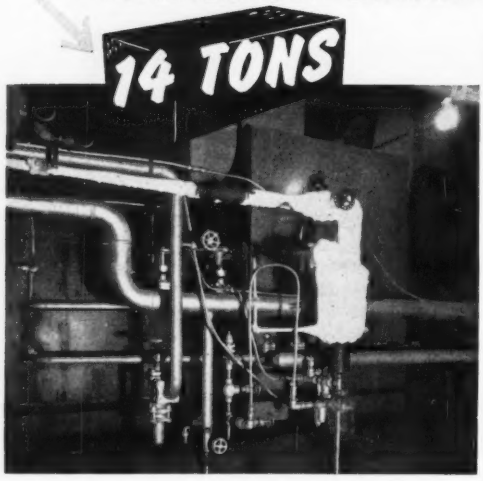


CUSTOM FITTED TO YOUR NEEDS

With ten sizes to choose from—and with your Steamaster representative to advise the steam needs of your equipment, you're sure of just the right size Steamaster boiler for your present or future needs. A can't be-copied service that saves you buying "too big" or "too little." Ask for it!

STEAMASTER AUTOMATIC BOILER CO.

ARMSTRONG PURGER UPS REFRIGERATION CAPACITY



At Velvet Freeze, Inc., Ice Cream . . .

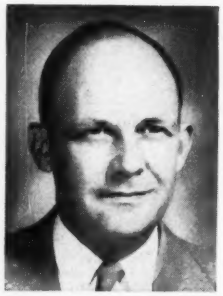
VELVET FREEZE, INC., Kansas City, uses an Armstrong Forged Steel Purger to keep their system free of air and other non-condensables and it is paying off handsomely. The purger has reduced head pressure 30 lbs. Since each 4 lbs. excess head pressure reduces capacity 1%, a total of 14 tons has been restored to Velvet Freeze's 185 ton system. Other benefits: In 6 months, the Purger saved 1500 lbs. of ammonia—$255. Power costs were reduced $274 per month. In less than a month the Purger paid for itself several times over.

Check your system for excess head pressures. If it's high, the Armstrong Purger offers you a real opportunity to increase your capacity. In any case, the benefits of Armstrong automatic purging are worthy of your earliest investigation. For full details . . .

SEND FOR BULLETIN 192
explains all Armstrong Purgers, their benefits and why you get them.

ARMSTRONG MACHINE WORKS
866 Maple Street • Three Rivers, Michigan

Men & Companies



Robert G. Ruark is now executive assistant to Dr. E. W. Reid, president of the Corn Products Refining Co.

Industry

Anheuser-Busch, Inc., plans construction of a brewery in Los Angeles. Ultimate cost: $45,000,000.

Blaw-Knox Construction Co. has received a contract from Swift & Co. to expand the latter's soybean processing facilities at Fostoria, Ohio. Goal: 200 tons per day.

Blumenthal Brothers, Philadelphia, will now be known as Blumenthal Brothers Chocolate Co.

Borden Co. is converting its milk plant at Macon, Miss., to processing of soluble coffee. It is also building a million-gal.-per-year ice cream plant at Woburn, Mass.

Bowman Dairy Co., Chicago, announces appointment of W. F. Kettell and M. R. DeBaets as associate directors.

Canada & Dominion Sugar Co. is installing two new pulp dryers at Wallaceburg, Ont. Cost: $300,000.

Canadian Breweries Ltd. has made J. G. Campbell president, and A. R. Gillespie, G. Abrams, and J. C. Henderson, vice-presidents.

Cia. Empacadora de Santiago de Cuba is name of planned plant to refine lard in Cuba. Cost: $500,000.

Continental Baking Co. announces a remodeling program for its Columbus, Ohio bakery. Cost: $100,000.

General Foods has sold its shrimp interests—known as General Seafoods, Inc.—to J. Lawrence Alphen and associates. New name: Alphen Seafoods, Inc.

Holly Sugar Co., Calif., recently had a warehouse fire. Damage: $1,000,000.

International Salt Co., Inc., has appointed Edson K. Green and Myron Hyman v.-ps.

Kingan & Co., Indianapolis meat packing concern, will be acquired by Hygrade Food Products Corp., Detroit, if currently negotiated sale of stock goes through. Deadline was early this month.

Meyer Sanitary Milk Co., Kansas City, is now property of syndicate headed by Paul Young, San Francisco. Price: $500,000.

Oriental Foods, Inc., Los Angeles, has received an RFC loan to help finance construction of a canning plant. Amount: $200,000.

Pepperidge Farm, Inc., is currently constructing a baking plant at Downers Grove, Ill. Cost: $1,250,000.

Salerno-Megowen Biscuit Co. has named Fred G. Salerno board chairman. Son, George Salerno is new president.

Joseph Schlitz Brewing Co. will build a brewery at Van Nuys, Calif. Cost: $20,000,000.

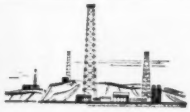
Southern Vegetable Oil Products Co., Lake Charles, La., has been organized for the extraction of oil from rice. Authorized capital: $300,000.

Stange-Pemberton, Ltd. is new company which will make seasonings and food colors for Canadian market. It represents Wm. J. Stange Co. of U. S.

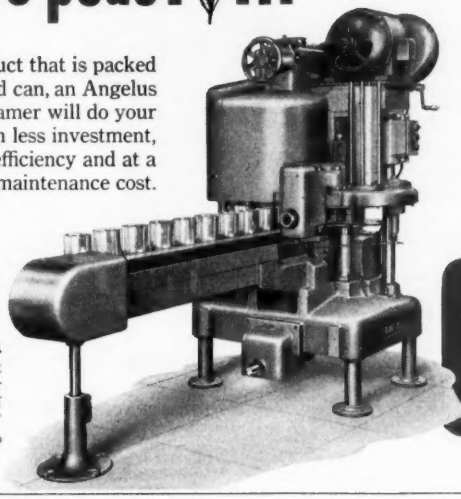
Utah-Idaho Sugar Co., Salt

George M. McCoy is newly elected executive vice president of the Borden Food Products Co., a division of the Borden Co. (Jean Raeburn photo)

from petroleum to peas. . . .



For any product that is packed in a round can, an Angelus Automatic Seamer will do your job with less investment, maximum efficiency and at a lower maintenance cost.



Model 60-L
High-speed, straight line feed seamer for spill-free closing of round cans 2" to 4¼" in diameter—up to 400 cans per minute

Investigate
the advantages of low cost production, low cost investment, and low cost maintenance with Angelus Automatic Seamers.

Write today
for complete details on models and an Angelus Engineered Application Recommendation.

ANGELUS
Sanitary Can Machine Company
Cable address "Angelcano" Western Union Code
1960 Pacific Blvd. • Los Angeles 58, Calif.

Cut Food Product Costs with PAYGEL

(A WHEAT STARCH)

Write for FREE sample and verify PAYGEL savings !

Better food products at less cost, with Paygel. That's what other food processors are getting . . . and YOU can too! Prove it for yourself in your products with a free sample of this superior wheat starch. Here are just two of many examples of improvements food processors have found resulting from the use of PAYGEL:

Salad Dressing: PAYGEL makes possible a 5 to 7% total starch reduction and replaces a blend of starches as an ideal dressing stabilizer. PAYGEL-based dressings retain their initial body without breaking down or thinning.

Soups: Up to 15% less PAYGEL may be used to replace ordinary thickeners in canned soups. Has excellent flavor retention characteristics and remarkable fat dispersion properties.

PAYGEL, a thick-boiling starch also gives good results in pie fillings, ice cream cones, caramel confections, dessert mixes, custards, canned specialty foods. TRY IT at our expense!

USE THIS COUPON FOR YOUR FREE SAMPLE OF PAYGEL

GENERAL MILLS, INC., Special Commodities Div.
Minneapolis 1, Minn.

Please send me free sample, technical information and price list on General Mills' PAYGEL.

Type of product or products _____

_____

Name _____

Firm _____

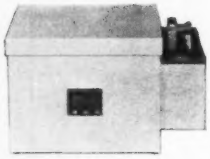
Firm Address _____

City _____ *State* _____

General Mills, Inc.
Special Commodities Division

Seedburo
STEINLITE
LIQUID CELL

Measures Moisture
IN 1/25th THE TIME



According to FOOD TECHNOLOGY, 1951, Vol. V., No. 6

". . . the Steinlite instrument is well adapted for simple, rapid determination of moisture content of sweet corn for canning. For each determination, by the vacuum oven method, make three for Steinlite, nine for Brown-Duvel."

Compare the Time

1 Vacuum Oven Test approximately 8½ hours

9 Brown-Duvel Tests one hour each, approximately 9 hours

3 Steinlite Tests 5-6 minutes each, approximately 20 minutes

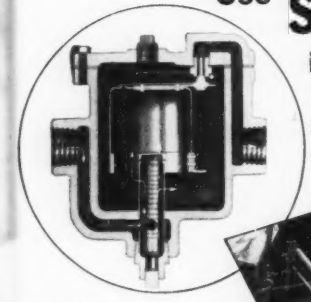
Use the Steinlite Model 300 for determining harvest time, cooking or processing time in canning or freezing corn, pumpkin, many fruits and hundreds of other food products.

WRITE FOR Descriptive Folder "A Report to Food Processors"

SEEDBURO
EQUIPMENT CO.
734 Converse Building Chicago 6, Illinois

FOR HARD SERVICE

Use SARCO inverted bucket STEAM TRAPS



On Laundry Presses

Simplest construction; minimum maintenance cost; largest capacity; longest life. Since 1936 furnished with built-in strainer in all sizes, ½" to 2". Pressures to 900 psi. Catalog 351

524

SARCO SAVES STEAM
SARCO COMPANY, INC.
Empire State Bldg., New York 1, N.Y.
SARCO CANADA, LTD., TORONTO 5, ONTARIO

Norman Bauch has been appointed director of sales for Reddi-wip, Inc.

Lake City, will build a beet sugar refinery at Moses Lake, Wash. Cost: $7,000,000.

Valley Evaporating Co., Wenatchee, Wash., is testing a process of "dehydrofreezing" apricots. Process: Remove half water, then freeze.

Personnel

Austin L. Adams is now chairman of the Atlantic Coast Fisheries Co.

Walter C. Baumhogger has been made general manager of G. Krueger Brewing Co., Newark, N. J.

Reed A. Blackwell has been elected executive vice-president of Gorden Foods, Atlanta, Ga.

Fred J. Boelter is newly elected president of Megowen-Educator Food Co., Lowell, Mass.

Joseph A. Butts is new assistant sales manager to Norman Butts of the G. S. Suppiger Co., Collinsville, Ill.

Connell G. Cowan is now general sales manager of Southern Pecan Shelling Co.

Jack DeWitt, formerly of General Foods, is now sales promotion manager for Blue Boy Div. of Haxton Foods, Inc., Oakfield, N. Y.

John F. Hazelton succeeds the late Paul W. Cleveland as a board member of Beatrice Foods Co.

Frank P. Lindsey, Jr., has been re-elected president of the Georgia Dairy Assn.

H. R. Logan has acquired the plant of Riverton Packing Co., Riverton, Wyo. He has named it Logan Packing Co.

William M. Meyer succeeds William P. Meyers as president of J. P. Michael Co., Indianapolis.

Elvon Musick has been re-elected president of Pineapple Growers Assn. of Hawaii, San Francisco.

W. R. Parliament, plant manager for Canada Packers Ltd. at St. Boniface, Manitoba, has been elected a director.

Henry T. Quinn is now a vice-president and board member of the John Morrell & Co. plant at Sioux Falls, S. D.

Alden C. Smith of Shiocton Kraut Co., Shiocton, Wis., is new president of the National Kraut Packers' Assn.

Dr. Roger W. Truesdail, president, Truesdail Laboratories, Inc., Los Angeles, will address university and technical groups in Norway, Sweden, Denmark, Holland, Belgium, France, and England. Among topics: "Recent Developments of Food Technology in the U. S. A."

W. Harlow Waggoner succeeds the late Norman L. Waggoner as president and general manager of Santa Clara Packing Co., San Jose.

Bruce Watson, formerly assistant director, is now manager of the General Foods public relations department.

Charles S. Wood has been appointed manager of Oregon-Idaho plants of the Smith Canning Co., Pendleton, Ore.

John Xitco is now manager of High Seas Tuna Packing Co., San Diego, a subsidiary of French Sardine Co.

Ralph G. Zimmerman has been elected president of Zimmerman Packing Co., Norwood, Ohio. He succeeds his father, the late Charles H. Zimmerman.

Paul Zuckerman, president of Velvet Peanut Products and Krun-Chee Potato Chip Co., Detroit, has been elected a director of E. & B. Brewing Co., Detroit.

Larry Goff is now New England sales manager for American Home Foods, Inc.

Read What Fulham Bros. Inc. Say About Their

Amerio CONTACT PLATE FREEZERS

"They are most satisfactory in every respect. They are very flexible and admirably suited to an operation such as ours which requires the rapid freezing of one, five and ten pound units at various times during the day."

"We are particularly satisfied with the minimum of moving parts which allow us to operate efficiently. Packages are frozen rapidly and uniformly, and retain the neat appearance so necessary for good sales appeal."

Mr. Thomas A. Fulham, Vice President of Fulham Bros. Inc. checks the loading of "4-Fisherman" Brand Seafoods into Amerio Plate Freezer.

Check These Features

FULL FLAVOR & QUALITY RETENTION
MINIMUM FREEZING TIME
SIMPLICITY OF OPERATION

CONTINUOUS HIGH PRODUCTION
MAXIMUM FREEZING AREA
NO SHRINKAGE

WIDE FLEXIBILITY OF PRODUCTS
MINIMUM OF FLOOR SPACE
REDUCED CLEANING TIME

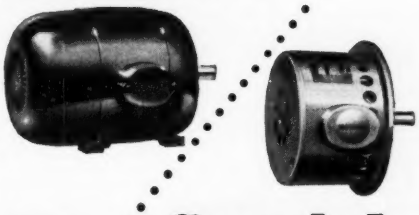
ECONOMY — LOWER POWER CONSUMPTION PER POUND OF PRODUCT — MAINTENANCE COSTS PRACTICALLY ZERO

Designed For Ammonia, Brine or Freon Refrigerant

Amerio
Contact Plate Freezers Inc.
Union City, N. J.
"It's the Contacts that Count"

Send For Illustrated Brochure

Standard



or Special

Industrial electric motors are our only business

That's why we can give you prompt delivery on motors from 250 down to 1/6 H.P., single or polyphase — whether general purpose, totally enclosed, explosion-proof, splash-proof, sanitary, specials. Call your local Howell representative or write us direct.

HOWELL ELECTRIC MOTORS CO.
HOWELL, MICHIGAN

At Your Service

CENTRAL FIBRE PRODUCTS CO., INC.

MORE THAN 80 YEARS OF CONTINUOUS SERVICE AND PROGRESS

Paperboard Materials
Corrugated Containers
Folding & Set-Up Boxes
Produce House Supplies
Expendable Fibre Pallets

PAPERBOARDS
Corrugating Material—Liner Boards · Folding and Set-Up Boxboards · Can, Tube and Cap Stock · Beer Case Partitions. Mills at Quincy, Illinois; Vincennes, Indiana; Tama, Iowa; Denver, Colorado; Hutchinson, Kansas

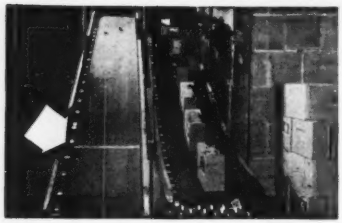
CORRUGATED SHIPPING CONTAINERS
C. F. Downey Box Co., North Kansas City, Missouri · Eggers O'Flyng, Omaha, Nebraska · Inland Paper Box Company, Denver, Colorado · Marshalltown Container Co., Marshalltown, Iowa · Pomeroy Manufacturing Co., Vincennes, Indiana · Quincy Container Division, Quincy, Illinois · Western Paper Products Co., Salt Lake City, Utah

FOLDING AND SET-UP BOXES
American Folding Box Co., St. Louis, Missouri · Bruce Carton Company, Memphis, Tennessee · Continental Paper Products Co., Denver, Colorado · Eggers O'Flyng, Omaha, Nebraska · Western Paper Products Co., Salt Lake City, Utah

MODERN PRODUCTS FOR BETTER PACKAGING AND SHIPPING — *and better selling!*

ALLIGATOR®

CONVEYOR BELT LACING



*Every Tooth A Vise**

in Long Continuous Lengths . . . made of Stainless Steel or Monel for Food Plants

- ★ Excellent for flat conveyors, package conveyors, portable loaders, etc. specify Stainless or Monel.
- ★ In canneries where corrosion or rust is a problem specify Alligator made of stainless steel or Monel.
- ★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
- ★ Separable and smooth on both sides.
- ★ 12 sizes. For belts from 1/16" to ¼" thick — and *any width.*

Order from Your Supply House. Ask for Bulletin A-60.

FLEXIBLE STEEL LACING CO. 4646 Lexington St., Chicago 44, Ill

JUST A HAMMER TO APPLY IT

NATURAL SPICES ASSURE FULL FLAVOR

The proper use of natural spices guarantees full-flavored food products at the time of eating because the natural spice flavor is protected against excessive evaporation by the cells and fibers of the spice itself. Use natural spices properly and you'll retain full fine flavor and aroma in your finished product. You'll please your customers. You'll build a better business!

AMERICAN SPICE TRADE ASSOCIATION

82 WALL STREET
NEW YORK 5, N. Y.

Whiting N. Shepard has been promoted to director of sales, Boston Woven Hose & Rubber Co.

Associated Industry

Aluminum Co. of America plans constructing aluminum smelting project in Alaska when land and government approvals are obtained. Cost: $400,000,000.

American Can Co. has set its Portland, Ore., milk container plant in operation. This brings postwar expansion costs to: $184,000,000.

American Wood Products Corp., Marion, S. C., subsidiary of American Box Co., purchased new veneer mill at Millry, Ala., to up container production.

Celanese Corp. of America has named Henry R. Michel purchasing director.

Continental Can Co. of Canada Ltd. announces appointment of Frank A. Whittall as president.

Cork Import Corp., Englewood, N. J., will be known henceforth as National Cork Co.

Deepfreeze Appliance Div. of Motor Products Corp. has made Harley W. Whitmore engineering director.

Empire Box Corp., Garfield, N. J., has named Robert C. Ewer assistant sales manager.

Food Machinery & Chemical Corp., San Jose, now has Joseph B. Cary as executive committee chairman.

Glyco Products Co., Inc., recently began producing edible monoglycerides at its Williamsport, Pa., plant.

Hazel-Atlas Glass Co., Wheeling, W. Va., has purchased land in Plainfield, Ill., for construction of a glass-container plant.

Macwhyte Co. announces appointment of A. M. Naysmith and general superintendent and plant engineer.

Norton Co. now has Wallace L. Howe as director of research and development. He succeeds Milton F. Beecher, retired.

Yale & Towne Mfg. Co. has made sales managers of J. I. Somers, and T. F. Moriarty.

Deaths

Ebenezer Bull, 82, one of Dairymen's League founders. —Aug. 16.

Louis Firstenberg, 76, president of Firstenberg Bottlers Supply Co., Inc.—Aug. 29.

Hugh J. Fraser, 55, vice-president of International Nickel Co.—Aug. 22.

Andrew E. Holmes, 63, retired president of Angostura-Wupermann Corp.—Sept. 2.

Thomas W. Koch, 61, director of advertising and sales promotion for Shellmar Products Corp.—Aug. 18.

Henry H. McVey, Jr., 39, former Kingan & Co. manager.—Aug. 13.

Joseph J. Merrill, 86, chief engineer, Corn Products Refining Co.—Aug. 15.

L. J. Owen, 42, manager of Coca-Cola Bottling Co. plant at Daytona Beach, Fla.—Aug. 14.

William R. Ray, 73, board chairman of the General Controls Co., Glendale, Calif.—August.

Ole Salthe, 65, executive secretary of Nutrition Foundation, Inc.—Sept. 10.

Norman L. Waggoner, 63, president of Santa Clara Packing Co., San Jose, and director of National Canners Assn. (see Personnel)—Jul. 2.

Samuel G. Gorsline, 67, secretary of the Canning Machinery & Supplies Assn., passed away Aug. 22.

Just Off the Press

New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—

Food Plant Equipment

Steam Traps

Comprehensive analysis of needs and uses for steam traps are topic of Bulletin T-1740. Gives prices, weights, construction factors plus numerous additional details. 24 pages. — *Yarnall - Waring Co., Chestnut Hill, Philadelphia 18.*

Circle L219A on Reader Service Card

Mixer Agitator

New mixer-agitator, described in Bulletin 52A, is portable via detached motor coupled to it by flexible drive shaft. Shaft speeds and applications are listed. 8 pages.—*Albert P. Hill Co., Inc., 233 Oliver Ave., Pittsburgh 22.*

Circle L219B on Reader Service Card

Combustion Models

Oil and gas combustion equipment for use in construction, production, and maintenance applications are subject of Catalog 52. Standby oil firing is explained. 12 pages.—*Hauck Mfg. Co., 124-136 10th St., Brooklyn 15.*

Circle L219C on Reader Service Card

Capacity Pumps

Range of pumps discussed in new catalog has capacities from 20 to 200 gpm. Combinations and permutations possible with accessories are featured. 38 pages. —*Yale & Towne Mfg. Co., Chrysler Bldg., N. Y. 17.*

Circle L219D on Reader Service Card

Motor List

Extensive motor list is given in Form 943 on many types of motors. Synchronous as well as special-application motors may be found. 4 pages.—*Century Electric Co., 1806 Pine St., St. Louis 3.*

Circle L219E on Reader Service Card

Pumps & Feed Systems

New Bulletin 351 covers volume pumps and automatic chemical feed systems. Air-operated units are shown in cutaways with supporting data. 24 pages.—*Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia, 18.*

Circle L219F on Reader Service Card

Capacity Mixers

Variety of products may be mixed via two units depicted in Bulletin 509. Built for mulling pressure and efficiency of mulling action. 6 pages.—*National Engineering Co., 549 W. Washington Blvd., Chicago 6.*

Circle L219G on Reader Service Card

Steam Trap Selector

Numerous detailed graphs and tables abound in Bulletin T-1750 treating new steam trap selector. All facets of food applicability covered. 20 pages.—*Yarnall-Waring Co., Chestnut Hill, Philadelphia 18.*

Circle L219H on Reader Service Card

Heater Apparatus

Montage of installations are given in pamphlet describing grid-type unit heater. Features and capacity tables are included.—*D. J. Murray Mfg. Co., Wausau, Wis.*

Circle L219I on Reader Service Card

"Worm-Gear" Motor

Attractive bulletin describes low speed right-angle worm-gear motor. Pyramidal mounting, asbestos-protective windings, and easy inspection are three of claimed features. 8 pages.—*U. S. Electrical Motors Inc., Milford, Conn.*

Circle L219J on Reader Service Card

Cooling Towers

Well-illustrated Catalog CT-52-4 presents material on advantages of cooling towers. An "Inquiry Data Sheet" for planning requirements is included. 36 pages.—*Foster Wheeler Corp., 165 Broadway, New York 6.*

Circle L219K on Reader Service Card

Control Equipment

Circular Thermometers

Recording and indicating circular-case electric-control thermometers for drying ovens, cooking kettles, and other units are explained in Catalog 6482. 10 pages. —*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Circle L219L on Reader Service Card

Tomato Mold Data

Bulletin 30, *Mold Counting of Tomato Products*, covers quality control in relation to growth, processing, and canning of tomatoes in all forms. Valuable analysis of subject. 44 pages.—*Continental Can Co., 100 E. 42nd St., New York 17.*

Circle L219M on Reader Service Card

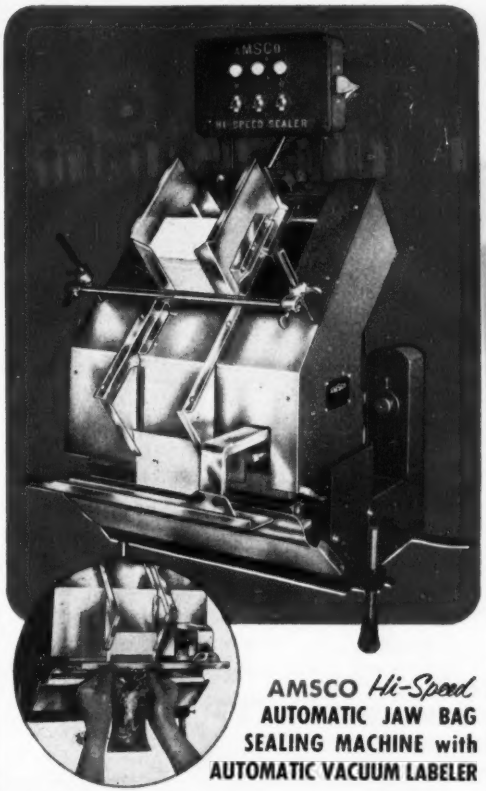
Making a quality product is *your* business!

Packaging it economically is *our* business!

that is why

AMSCO Packaging Equipment

is used by America's largest Packagers and Manufacturers



AMSCO *Hi-Speed* AUTOMATIC JAW BAG SEALING MACHINE with AUTOMATIC VACUUM LABELER

Tops of filled bags are automatically folded, labeled and sealed . . . *in one operation.* Quick changeover for different face-widths labels (rectangular and die-cut) in the standard range from 3 to 7 inches. For complete details on this and other AMSCO packaging equipment, write Dept. FE-10.

Amsco **AMSCO PACKAGING MACHINERY, INC.**

31-31 48th Avenue Long Island City 1, N. Y.

Specialists in Diversified Packaging Equipment.

Get this valuable packaging book...

Free!

whatever you manufacture...

you'll be interested in this treasure chest of sales stimulating packaging ideas. Contains practical information on the use of attractive corrugated packages as economical and effective point-of-purchase merchandising material, not only affording proper product protection but also serving as excellent product "salesmen." Send for your free copy of "Pack To Attract." Write, or mail coupon below, to HINDE & DAUCH, 2509 Decatur Street, Sandusky, Ohio.

H&D®

HINDE & DAUCH

Authority on Packaging

Akron, Baltimore, Battle Creek, Mich., Bloomington, Ill., Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Denver, Detroit, Fairfield, Conn., Findlay, Ohio, Gloucester City, N. J., Greensboro, N. C., Hoboken, Indianapolis, Jamestown, N. Y., Kansas City, Lenoir, N. C. Minneapolis, Omaha, Plymouth, Ind., Reading, Pa., Richmond, Va., Roanoke, Va., Rochester, Sandusky, Ohio, Shrewsbury, Mass., St. Louis, Toledo, Watertown, Mass.

mail today!

HINDE & DAUCH, 2509 Decatur Street, Sandusky, Ohio

Please send me a free copy of "Pack To Attract."

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Instrument Panelboards

Conventional and graphic type panelboards, as well as measuring and control instruments utilized, come under discussion in Bulletin 85-20. Excellently illustrated. 32 pages.—*Minneapolis - Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44.*

Circle L221A on Reader Service Card

Laboratory Balances

Versatility and accuracy are keynoted in Folder 3270 describing laboratory balances. Stated to cut centrifuge vibration and wear. 4 pages.—*Exact Weight Scale Co., Columbus 8, Ohio.*

Circle L221B on Reader Service Card

Dust Filters

Specifications covering dust filtering units are given in Bulletin 350. Actual uses are incorporated pictorially. 4 pages.—*Dracco Corp., Harvard Ave. & E. 116th St., Cleveland 5.*

Circle L221C on Reader Service Card

Indicating Pyrometers

Bulletin G-3 lists and describes indicating pyrometers for panel mounting and portable uses. Shows 9 temperature ranges from −200 to +3,000 deg. F. 4 pages.—*Assembly Products Inc., Main at Bell St., Chagrin Falls, Ohio.*

Circle L221D on Reader Service Card

Manometer Manual

Comprehensive Bulletin 313 on manometers includes facts on installing, operating, and servicing. How they operate and what they measure are salient features. 12 pages.—*King Engineering Corp., 400 Detroit St., Ann Arbor, Mich.*

Circle L221E on Reader Service Card

Oil Filter

Leaflet shows metal oil filter and discusses advantages of same. Said to eliminate need for cartridge pack replacements.—*Permanent Filter Corp., 2309 Riverside Dr., Los Angeles 39.*

Circle L221F on Reader Service Card

Control Centers

Standardized modular motor control centers are topic of Bulletin 400. Presented is plan on laying out center for high flexibility. 8 pages.—*Continental Electric Equipment Co., Box 1055 Cincinnati 1.*

Circle L221G on Reader Service Card

Pressure Gages

Indicating and recording pressure gages are discussed in Folder 708. Construction and engineering details are highlighted. 4 pages. — *Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Circle L221H on Reader Service Card

Lab Specialties

Selection of recently-developed equipment for laboratory use is presented in Catalog 16B-S. 64 pages.—*Griffin & Tatlock Ltd., Kemble St., Kingsway, London, W.C2.*

Circle L221I on Reader Service Card

Contact-Meter Relays

Circuit diagrams and lists of components for contact-meter relays are given along with facts on mounting, cleaning, and servicing in pocket-sized booklet. 22 pages.—*Assembly Products, Inc., Chagrin Falls, Ohio.*

Circle L221J on Reader Service Card

Instrument Data

Prices, application recommendations, and pertinent information on instrument sensing units and accessories are available in new catalog. Foremost are thermocouples, radiation detectors, and resistance bulbs. 42 pages.—*Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.*

Circle L221K on Reader Service Card

Thermistor Catalog

Physical and operating characteristics of thermistors are discussed in Catalog TH-5. Data on temperature-resistance ratio features are listed. 30 pages.—*Carboloy, Dept. of General Electric Co., Detroit 32.*

Circle L221L on Reader Service Card

Precision Tachometers

Portable and fixed precision tachometers are subject of Folder T4. Simplified circuit diagrams and photos of models are given. 4 pages.—*Metron Instrument Co., 432 Lincoln St., Denver 9.*

Circle L221M on Reader Service Card

Pump, Compressor Controls

Automatic controls for pumps and air compressors are shown along with prices in Bulletin 1534-K. Replete with relevant facts. 20 pages.—*Penn Electric Switch Co., Goshen, Ind.*

Circle L221N on Reader Service Card

Humidity Controller

System of humidity control via specific unit is explained in recent catalog. Operating advantages are correlated with supporting data. 8 pages.—*Surface Combustion Corp., Toledo 1, Ohio.*

Circle L221O on Reader Service Card

Heavy-Duty Scales

Innumerable heavy-duty scales are pictured in interesting foldout. Many uses are outlined. 8 pages.—*Detecto Scales Inc., 540 Park Ave., Brooklyn 5.*

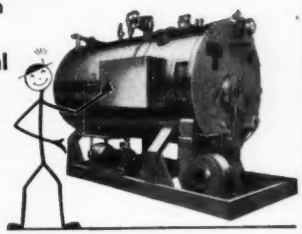
Circle L221P on Reader Service Card

Brewer's Microscope

Uses for brewer's microscope

ACCESSIBLE! THAT'S THE AMESTEAM GENERATOR FROM EVERY ANGLE

Eye-Level Controls . . . Protected from Dirt, Water and Accidental Damage . . . And Look at the Space Underneath Shell, too!



EVERYTHING'S Easy-To-Get-At!

10 to 500 h.p. — 15# to 200# w.p.

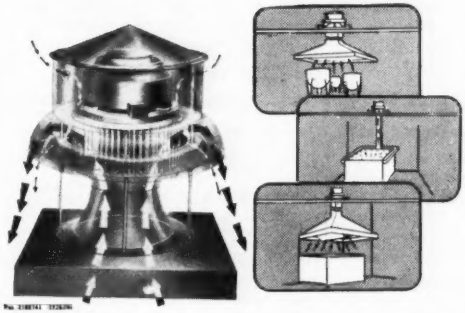
OIL or GAS

AMES IRON WORKS

Box F-10, Oswego, N.Y.

Builders of Better Boilers Since 1848

IT PAYS to know these Facts about Exhausting Moisture and Fumes



CERTIFIED RATINGS: Gallaher Air Vans are tested by an independent laboratory — a test of the whole unit *not* just the fan wheel. You can be sure of Gallaher performance data — it's tested *not* interpolated.

EFFICIENT: SCROLL EFFECT designed into the unit and exclusive with Gallaher. Research tests show that efficiency against *even normal* static pressures is not possible without it.

SAFE MOISTURE AND FUME REMOVAL — Motor out of the air steam with the exclusive patented air seal off to make it certain. How safe? Gallaher units are safely used for ether and air concentrations *without* explosion proof motors.

STRONG: We invite comparison with any comparable unit. Our specifications are *published* and available by asking your local Gallaher representative or writing Dept. A, 4108 Dodge Street, Omaha, Nebr.

Capacities 150-11,000 CFM; Static Pressures to 1¾"

The GALLAHER Company

Omaha, Nebr. Owatonna, Minn.

THE IMPROVED

Exide-Ironclad

BATTERY

OUTSTANDING NEW FEATURES INCLUDING

the polyethylene insulating tube sealer combine to make Exide-Ironclad, *more than ever before,* YOUR BEST POWER BUY . . . AT ANY PRICE.

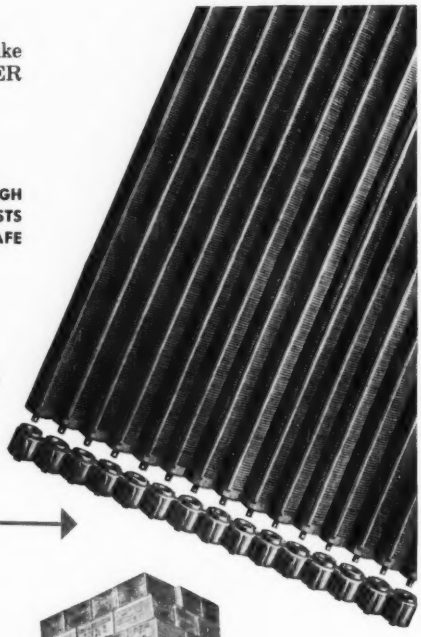
THE IMPROVED EXIDE-IRONCLAD IS BUILT TO GIVE YOU . . .

RAPID ACCURATE HANDLING . . . UNIFORM RATE OF HANDLING . . . HIGH AVAILABILITY . . . LOW OPERATING COSTS . . . LOW MAINTENANCE COSTS . . . LOW DEPRECIATION COSTS . . . HIGH MANEUVERABILITY . . . SAFE HANDLING.

BECAUSE OF . . .

IMPROVED POSITIVE PLATE CONSTRUCTION. The long-life grids now contain SILVIUM—an alloy of silver, lead and other components—which make them highly corrosion resistant.

. . . the New Polyethylene insulating tube sealer of acid-proof, non-corroding plastic. It fits snugly into slotted tubes of positive plate, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus more active material remains available, and the high battery capacity is maintained for a longer working life.



IMPROVED NEGATIVE PLATES for higher electrical efficiency.

NEW SEALING COMPOUND—provides permanent seal between jar and cover.

SEAMLESS SHOCK-PROOF JAR, of high quality rubber combines tensile strength and elongation for long-life and heavy-duty service.

NEW UNBREAKABLE PLASTIC VENT PLUGS of polyethylene.

TYPES, SIZES AND CAPACITIES for all kinds and makes of battery-electric trucks—hand and rider.

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia 2
Exide Batteries of Canada, Limited, Toronto

1888
DEPENDABLE BATTERIES FOR 64 YEARS
1952

"EXIDE-IRONCLAD" and "SILVIUM" *Reg. T.M. U.S. Pat. Off.*

advanced in leaflet include quality control, sanitation checks, and raw material inspection. — *American Optical Co., Instrument Div., Buffalo 15.*

Circle L221Q on Reader Service Card

Index Controllers

Combination of variable speed and correction transmission in single units are features of index controllers in recent bulletin.— *Machine O' Matic, Inc., Box 238, Ashley, Ohio.*

Circle L223A on Reader Service Card

Fluid Meter

Automatic fluid meter applicable in batching light or heavy liquids is outlined in Bulletin FL-49. 8 pages.—*Hetherington & Berner Inc., 701-745 Kentucky Ave., Indianapolis 7.*

Circle L223B on Reader Service Card

Materials Handling

Magnetic Pulleys

Catalog 152 describes permanent magnetic pulleys. Applicable in processing salt, peas, beans, sugar, bran, and other foods. 6 pages.—*Magnetic Engineering & Mfg. Co., Clifton, N. J.*

Circle L223C on Reader Service Card

Anent Packagers

Paper packaging machine is presented in new bulletin. Claimed impossible to jam due to improper feeding. Other advantages listed. 4 pages.—*Lynch Corp., Toledo, Ohio.*

Circle L223D on Reader Service Card

Varied Screens

New catalog gives data on various screens such as vibrating, shaker, conveyor, centrifugal, rotary, and many others. 24 pages. —*Bixby-Zimmer Engineering Co., Galesburg, Ill.*

Circle L223E on Reader Service Card

Roller Conveyors

Gravity roller conveyors are topic of well-bound catalog. Detailed construction characteristics and installations are featured. 28 pages.—*Lamson Corp., Syracuse, N. Y.*

Circle L223F on Reader Service Card

Bag Apparatus

Machines for producing cellophane, diaphane, pliofilm, polyethylene, and coated paper bags are discussed in recent brochure. 4 pages.—*Roto Bag Machine Corp., 130 E. 13th St., New York 3.*

Circle L223G on Reader Service Card

All-Type Cappers

Topping containers of all types is function of cappers shown in recent foldout. Specifications included. 6 pages.—*Resina Automatic Machinery Co., Inc., Brooklyn 31.*

Circle L223H on Reader Service Card

Filler & Sealer

Continuous automatic carton filling and sealing machine is topic presented in bulletin. Lists alleged reduction of packaging costs. 4 pages.—*Clybourn Machine Corp., 6479 N. Avondale Ave., Chicago 31.*

Circle L223I on Reader Service Card

Marking Machines

Conveyor-line marker, multiwall bag printer, and corrugated and fiber shipping case printer are units depicted in new bulletin. 20 pages.—*Industrial Marking Equipment Co., Inc., 454 Baltic St., Brooklyn 17.*

Circle L223J on Reader Service Card

Can Washing System

Can washing system—particularly useful to dairy plants—is described in small catalog. Applicable units are given. 92 pages.—*Lathrop-Paulson Co., 2459 W. 48th St., Chicago 32.*

Circle L223K on Reader Service Card

Plant Supplies

Welding Fittings

Pipe performance is enhanced, claims new leaflet, with use of welding fittings described.—*Tube Turns, Inc., Louisville 1.*

Circle L223L on Reader Service Card

Protective Coatings

Advantages of particular-type protective coatings are outlined in catalog, *Stop Profit-Eating Corrosion.* 4 pages.—*Prufcoat Laboratories, Inc., 50 E. 42nd St., New York 17.*

Circle L223M on Reader Service Card

Floor-Care Products

Floors Without Flaws is title of bulletin discussing conditioning, repairing, and maintenance of floors. 12 pages.—*A. C. Horn Co., Inc., 10th St. & 44th Ave., Long Island City 1, N. Y.*

Circle L223N on Reader Service Card

Refractory Linings

Installations of refractory linings for fireboxes and heating boilers are given in recent folder. 6 pages. —*Plibrico Jointless Firebrick Co., Firebrick, Ohio.*

Circle L223O on Reader Service Card

Emulsifiers, Stabilizers

Wholesale list gives price data on emulsifiers, stabilizers, and

SERIES 300 PHILLIPS FLOAT CONTROLS

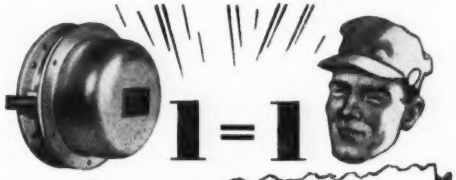
- SERVICEABLE—No pump down needed to inspect or renew cartridge.
- ADAPTABLE to most types of flooded evaporators
- COMPACT—mounts directly in surge drum.

Phillips Float Controls are available in capacities of 1 to 1000 tons for "Freon" and 1 to 2000 tons for ammonia. Consult with Phillips engineers on applications of Phillips Float Controls for your present equipment or specifications on new units. Just call on us . . . we'd like to help.

Write for Catalog

H. A. PHILLIPS & CO. DESIGNERS AND ENGINEERS REFRIGERATION CONTROL SYSTEMS
3255 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS

Representatives: The C & S Equipment Co., 2103 S. San Pedro St., Los Angeles, Cal.
Mason Emanuels Co., 90 Dearborn St., Seattle 4, Wash.



"We have used your Bin-Dicators in our fertilizer plant for some time and would not be without them. I can show you a case where a single Bin-Dicator replaces a man," writes a New England manufacturer.

BIN-DICATOR "keeps an eye" on levels of bulk materials in silos, hoppers, bins, chutes and automatically reports to central control point. Prevents over-filling; prevents overfeed and underfeed to conveyors and filling equipment; prevents delays and waste. Low cost, easy to install, simplest operation. Widely used.

BIN-FLO Aerator Units keep dry, finely ground materials moving in bins, hoppers, chutes; prevent packing, bridging.

THE BIN-DICATOR CO.
13946-R Kercheval • Detroit 15, Mich.

NEW 1952 CATALOG FREE

For more information, use post card on last page.

They did

Every executive with a production problem will be interested in what this sugar refinery operator* did to solve his. During a concentrated six-month sugar harvest, machines must operate at peak capacity. Complete dependability is a vital factor because a perishable commodity is at stake. To increase production and insure continuous operation, this operator decided to modernize his mill.

what

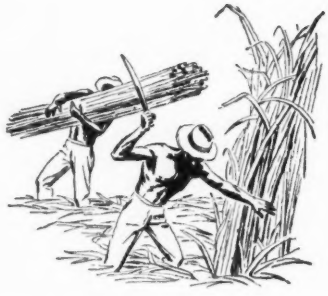
He turned to Westinghouse engineers for help on the electrical apparatus. He asked for a method, an operating proposal—not just a quotation on apparatus. His staff and ours worked out a system for power generation, distribution and utilization including integrated drives for the centrifugals. This is a system of many devices. Result . . . automatic operation increased over-all efficiency, reduced manpower requirements; stand-by problems were eliminated; valuable factory space was conserved through removal of belts and pulleys; maintenance became negligible.

you can do

You can profit by this operator's experience. It proves that capacity problems are solved with capacity thinking. We want to do that kind of thinking with you and your engineers.

to produce more

The actual devices can be selected later. It's how you put them together that counts—whether elevators, stokers, turbines, motors or transformers. Many manufacturers make good electrical apparatus. Westinghouse, in fact, makes a broader line than anyone else. But the priceless ingredient Westinghouse offers you, in addition, is the skill of broadly experienced engineers in putting together the right combination of good apparatus to let you produce more with what you have. Westinghouse Electric Corporation, Pittsburgh, Pa.



*name on request

YOU CAN BE SURE...IF IT'S

Westinghouse

thickeners. Fruit essences and flavoring products are among those listed. 20 pages.—*Geo. Lueders & Co., 427 & 429 Washington St. cor. Vestry, New York 13.*

Circle L223P on Reader Service Card

Water Softener

Booklet 4520-A gives detailed explanation of zeolite water softening, plus glossary of process terms and factors on equipment size.—*Cochrane Corp., Philadelphia 32.*

Circle L225A on Reader Service Card

Paper Protective

Line of paper units protected by maker's product against water, moisture, grease, contamination, and siftage is explained in small foldout. 6 pages.—*National Waterproof Papers, Inc., Box 467, Camden, N. J.*

Circle L225B on Reader Service Card

Conveyor Bearings

Catalog 210 notes specifications, installation features, and applications of bearings for screw and roller conveyors. 20 pages.—*Arguto Oilless Bearing Co., 138 W. Berkley St., Philadelphia 44.*

Circle L225C on Reader Service Card

Gas Burner Nozzles

Enlarged line of gas burner nozzles for heat processing applications is presented in Catalog 804-C. Capacities given. 4 pages.—*Hauck Mfg. Co.,*

Circle L225D on Reader Service Card

Liquid-Tight Gloves

Hand protection with liquid-tight gloves is keynote of attractive catalog. Gloves are in all-neoprene, neoprene coated, or vinyl coated. 28 pages.—*Pioneer Rubber Co., Willard, Ohio.*

Circle L225E on Reader Service Card

Chemical List

Number of chemicals for food and allied fields are listed in recent brochure. 40 pages.—*Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6.*

Circle L225F on Reader Service Card

Miscellaneous

Punched-Card System

New folder, Systems S-1770, covers various implements for effective punched-card system. Used chiefly in making up payrolls. 6 pages.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle L225G on Reader Service Card

Taking Air From Cans

Engineering the Air Removal from Canned Foods is title of recent research booklet. Discusses methods involved. 12 pages.—*Continental Can Co., Inc., 100 E. 42nd St., New York 17.*

Circle L225H on Reader Service Card

Vehicular Hoister

Compact hoister for all vehicular types is subject of foldout. Unit is air-operated. 6 pages.—*Homestead Valve Mfg. Co., Coraopolis, Pa.*

Circle L225I on Reader Service Card

Telephone Plan

Private business telephone systems for improved plant efficiency are depicted in Circular 1735. Installation, equipment, and planning are discussed. 8 pages.—*Automatic Electric Co., 1033 W. Van Buren St., Chicago 7.*

Circle L225J on Reader Service Card

Aluminum Glossary

Nomenclature is title of work compiling glossary of terms for aluminum sheet and plate plus aluminum extruded and tubular products. 20 pages.—*Aluminum Assn., 420 Lexington Ave., New York 17.*

Circle L225K on Reader Service Card

Fire Extinguishers

Carbon dioxide fire extinguishers with hose connections are detailed in leaflet. Sectional plans featured.— *American-LaFrance-Foamite Corp., Elmira, N. Y.*

Circle L225L on Reader Service Card

Utility Cabinet

Recently introduced utility cabinet is leaflet topic. Counter-high unit is all-steel, electrically welded, has two locking drawers.—*Dolin Metal Products, Inc., 315 Lexington Ave., Brooklyn.*

Circle L225M on Reader Service Card

Air Shipping Treatise

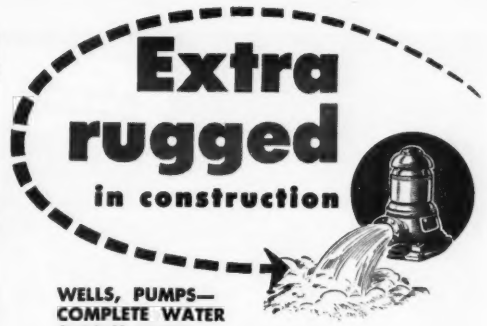
Revised edition of How To Ship By Air In Corrugated Boxes is now available. Gives information on use of air express, air freight, air parcel post, and other pertinent data.—*Hinde & Dauch Paper Co., Sandusky, Ohio.*

Circle L225N on Reader Service Card

Free Literature—Quick Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Readers Service postcard inside the back cover. Then sign at the bottom and mail. No postage is required.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.



**WELLS, PUMPS—
COMPLETE WATER
SUPPLY UNITS**

Layne puts a lot of extra ruggedness into the construction of their well and pump installations. This means that there is seldom repair expense of any kind for years to come. And matching ruggedness is the widely known and acknowledged Layne quality.

Why not have Layne install a water well supply on your property? The saving in water cost will more than justify the expense. For further information, catalogs, etc., address

Layne **LAYNE & BOWLER, INC.**
General Offices, Memphis 8, Tenn.

WATER WELLS
VERTICAL TURBINE PUMPS
WATER TREATMENT

for **FREE READER SERVICE**

Use the prepaid return card in the back of the magazine

Get literature, catalogs or detailed information that you need from manufacturers of equipment, materials, supplies, ingredients.

for your convenience

USE READER SERVICE

For more information, use post card on last page.

For almost 40 years, Glycerine has contributed to the keeping qualities of Heide "Licorice Pastilles". Glycerine's ability to retain moisture improves the shelf life of these familiar candies... keeps them fresh longer!

FULLY ACCEPTED . . . FULLY AVAILABLE IN ALL GRADES!

Improved stability of Glycerine supply means you can count on dependable delivery of this time-tested ingredient. You can confidently build your formulations around Glycerine—without concern for emergency substitutions.

Candy manufacturers and many other food processors rely on Glycerine's humectant action to preserve freshness and maintain palatability. It is widely used as a solvent for flavoring and coloring agents. Glycerine also acts as a sweetener and blending agent. Its high viscosity imparts smoothness to mixtures, prevents graining.

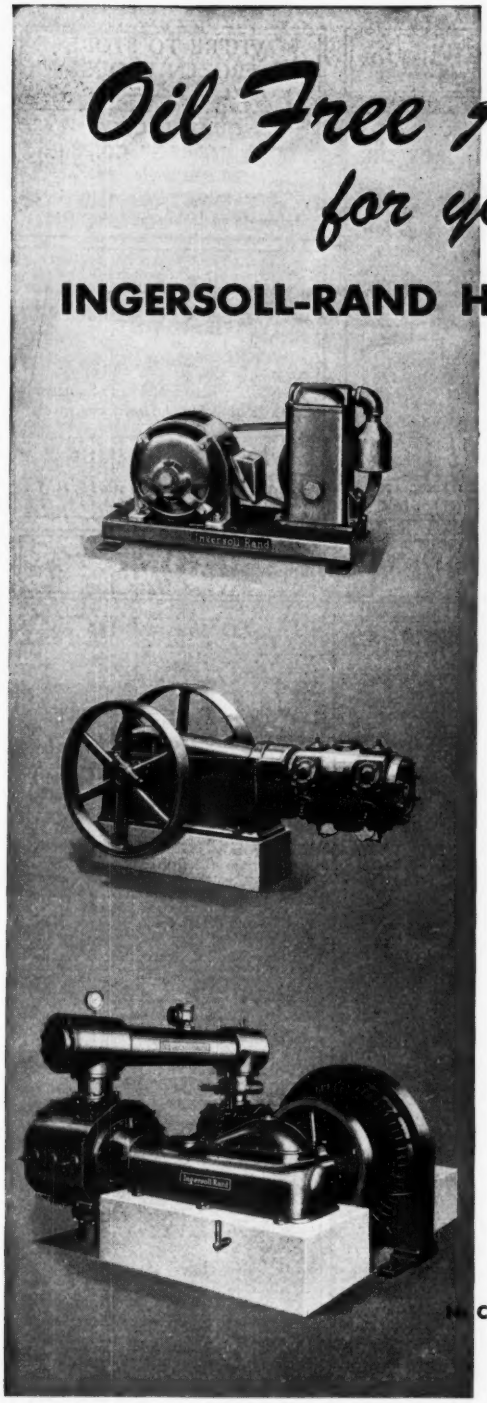
Recent research also indicates that Glycerine will lengthen shelf life of butter creams and similar perishables by suppressing fatty acid formation.

In hundreds of applications in the food field, U.S.P. Glycerine provides an unmatched balance of properties, ready acceptance, and established freedom from toxicity. Write for a copy of the booklet, "Why Glycerine for Foods?"

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue, New York 17, N. Y.

Oil Free Air for your Instruments

INGERSOLL-RAND HAS NL COMPRESSORS FROM THE SMALLEST TO THE LARGEST



Air-operated instruments, like production tools, are vitally important. That's why so many plants are using Ingersoll-Rand NL air compressors, that *don't pump oil.* This guards against instrument failures caused by oil-laden air.

Non-lubricated compressors, pioneered by I-R, feature pistons fitted with graphitic-carbon rings that prevent metallic contact of the piston with the cylinder bore. These carbon rings are segmental with metallic inner expanding rings, to give the proper wall pressure. Because metallic contact is eliminated, and the rings are self-lubricating, the Ingersoll-Rand NL Compressor cylinders require no lubricant.

To really put an end to production delays and excessive maintenance costs caused by oil-clogged instruments, get all the engineering facts and figures I-R makes available. Simply contact your nearest I-R representative, or write direct to Ingersoll-Rand, 11 Broadway, New York 4, New York.

Model N machines available through 1 hp.

Model 235 HNL machines available through 3 hp—other models through 250 hp.

Ingersoll-Rand

717-3

NL Compressors . . . 70 years of compressor "know-how" packed into these new compressors for air operated instruments!

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

PROFESSIONAL SERVICES

J. PAUL BISHOP AND ASSOCIATES
Food and Chemical
Consulting — *Engineers*
Specializing in:
Designing, Estimating and Engineering of New and Modernizing of Old Food and Chemical Plants and Processes.
Internationally Known.
Write P. O. Box 348
Champaign — Illinois

BRADBURY RESEARCH ASSOC., INC.
Food Plant Consultants
PLANT SANITATION—MANDATORY LABELING. LABORATORY SERVICES; Filth in foods, food analysis, bacteriological tests.
817 Moody Street — Waltham 54, Mass.

FOOD DEVELOPMENT LABORATORY
Consulting Service
S. W. ARENSON, DIRECTOR
Service to the Baking and Potato Chip Industries
Baking, Frying, Chemical, Physical
Product Development Formulation Quality Control
1403 Eutaw Place — 1133 Broadway
Baltimore, Md. — New York, N. Y.

LEWIN ASSOCIATES
Industrial Consultants
DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultations—Reports—Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Formulae, New Products.
1775 Broadway, N. Y. 19, N. Y. COlumbus 5-3276

KARL B. NORTON & ASSOCIATES
Successors to
DONALD K. TRESSLER & ASSOC.
Food Technologists and Engineers
Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.
North Compo Road — Westport, Conn.

GUSTAVE T. REICH
Consulting Chemical Engineer
Continuous Processes — Sugar
Complete Plants — Yeast, Molasses
Alcohol - Dry Ice - Waste
1422 Chestnut St. — Philadelphia 2, Pa.

SCHWARZ LABORATORIES, INC.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
More than 80 years of experience serving the food and beverage industries
Write for bulletin describing facilities and services
230 Washington St. — Mount Vernon, N. Y.

FOSTER D. SNELL, INC.
Research Chemists and Engineers
Organoleptic Panel Testing, Formulation and Stability; Protective Packaging
Inquiries invited on food research problems.
(Official Laboratory Association of Food Distributors, Inc.)
29 West 15th Street — New York 11, N. Y.
WA 4-8800

STRASBURGER & SIEGEL
Chemists — Bacteriologists — Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Libels, Expert Testimony
1403 Eutaw Place — Baltimore 17, Maryland

INGREDIENTS
For the Food Processor

CARROT OIL
makes foods
golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., Inc.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

New Advertisements

received by October 23rd will appear in the November issue subject to limitation of space available. Address copy to the

FOOD ENGINEERING
330 W. 42nd St., New York 36, N. Y.

SEARCHLIGHT SECTION

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

FACTORY MANAGER for moderate size Upstate New York food manufacturer. Must have food, chemistry, supervisory and industrial engineering experience. 30-40 years of age. State education, experience and salary requirements. Confidential. P-5529, Food Engineering.

MEAT PROCESSOR and Canner-Middle aged married man preferred with complete knowledge for the preparing and canning of Sausages-Hamburgers-roast etc. for starting operating pilot plant on the Island of "Jamaica"-Brish West Indies. Apply in own hand writing stating experience and salary wanted to Smith Equipment Co. Ind. 98 Forsyth Street, New York 2, N. Y.

WANTED EXPERIENCED Food Technologist or Chemist with food background. Will also accept applications for trainees for our quality control laboratories. Due to increased production and sales we are increasing our Quality Control Department. These openings are available at once in large eastern food manufacturing plant. P-5553, Food Engineering.

SELLING OPPORTUNITY OFFERED

WANTED: CHEMICAL Engineering for selling and servicing necessary basic ingredient to confectioners, bakers, ice cream and jam, jelly and preserve manufacturers. Preference given to experience in above lines. Must be willing to travel. Our company is large with well established national distribution and excellent reputation. Replies will be considered confidential and should include complete resume of personal qualifications with experience and salary expected. SW-4799, Food Engineering.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

CHEMIST-FOOD Technologist: 9 yrs. varied experience in food research and development on large variety of products; bench, kitchen, pilot plant. Excellent academic and biochemical background. Publications. Now employed in supervisory capacity. Age 36, M.S., single, will travel or relocate. Desire position in development or technical service. PW-5560, Food Engineering.

POSITIONS WANTED

CHEMIST, RESEARCH & Production, with wide experience in the development, manufacture, and technical control of confectionery, desserts, chocolate, cereal products, and other foods, desires position of responsibilty to fully use his ability. PW-5558, Food Engineering.

DEVELOPMENT ENGINEER — graduate Mechanical Engineer, 10 years design and production experience with automatic and process equipment, desires responsible position in food or dairy machinery field. PW-5560, Food Engineering.

RESEARCH & PRODUCTION Chemist, 30, married, long experience various foodlines, seeks change to position of responsibility and scope with view to management work; widely travelled—would prefer young progressive firm. PW-5552, Food Engineering.

SPECIALIST TECHNOLOGIST: Food products, Fish and Meat Products, Pickled fish European Style. PW-5486, Food Engineering.

FOOD PLANT Executive—Experienced in processing, canning, bottling, packaging of vegetables, liquids, cereals, and powders. Wide experience in the manufacture and packaging of prepared mixes. Engineering and management background. Desires position Plant Manager, Production Manager, Superintendent. PW-5577, Food Engineering.

FOOD PRODUCTION SUPT.—B.S. in Chemistry, 10 yrs. experience in manufacture and packaging of Gelatin and Pudding Desserts, Coffee, Tea, Instant Coffee. Supervisor of Production and Quality Control. At present Asst. to Plant Mgr. Age 33—Married. Eastern area preferred. PW-5576, Food Engineering.

SELLING OPPORTUNITY WANTED

SALESMAN COVERING Missouri and Kansas seeks product of merit to represent that area. P.O. Box 825, Minneapolis 1, Minn.

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to U. S. D. A. standards
h. Mold Counting and Insect Examination

MEN OR WOMEN: VETERANS OR NON-VETERANS: NIGHT CLASSES

Highly qualified instructors with practical experience and degrees in their respective fields.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS
P. O. Box 383, Coral Gables, Florida
Telephone: 87-5881

FOR SALE

Tanks: Pfaudler 3000 gal. glass lined vert. jktd.
Disintegrator: Rietz 40 hp.
Tank: 1000 gal. type 316 stain. steel.
Powder Mixers: 100 to 2000 lb. capacities.
Liquid Fillers: Vacuum and Siphon types.
Mixer: Read 380 gal., st. steel, 50 hp.
Centrifugal: Sharples airtight st. steel.
Kettles: Stain. Steel, all sizes, new and used.
Filter Presses: 7, 10, 12, 24".
Vacuum Pan: Henzsey 3000 lb. per hr., s.s.
Starch Cookers: Lee 300 gal. stainless steel.
Fillers: Geyer, Kiefer, Visco, M&S., Elgin.
Labelers: New Jersey, World, Knapp, Burt, Ermold.
Dough Mixers: Day, Read, Hobart, Champion.
Cappers: Capem Pneu. Scale, Elgin, U.S.
Vacuum Pans: 6' stain. steel, 5' copper.
Filters: Alsop, Ertel, Sparkler, Industrial.

Send us a list of your idle equipment

LOEB EQUIPMENT SUPPLY CO.
1931 W. North Ave. Chicago 22, Ill.

WANTED

FOOD PLANT WANTED
We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
"Confidential" C. J. GALE, Sec.
233 Broadway, N. Y. 7, N. Y. BA 7-1819

WANTED:

SURPLUS BOTTLES, JARS AND CAPS

We buy excess inventories of bottles, jars and caps of every description.

PENN BOTTLE & SUPPLY CO.

5619 Cherry St.
Phila. 39, Penna.

WANTED

TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pans, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351,
Church Street Sta., New York 8, N. Y.

WANTED

VILTER SNOW-MAKER

W-4786, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOR SALE FROM STOCK

12—3000 gal. Horiz. Stainless Steel Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.
1—Stainless Steel Steam Jacketed Kettle, with double motion agitator, 150 gal.
70—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 10, 40, 60, 80, 100, 150, 500 gal.
3—Lee 300 gal. T316 stainless steel salad dressing starch base cookers, water jacketed, double motion agitators.
35—Stainless Steel Tanks, 30, 60, 100, 150, 200, 300, 400, 500, 1000, 1400, 2350, 3000, 4200 and 5700 gal.
35—Aluminum Tanks, closed, 275, 330, 480, 500, 1350, 1450 gal.
4—Selectro Stailnless Steel Vibrating Screens, two-deck, 2'x7', enclosed.
10—Rotary Pellet Presses, Stokes B-2, D-3 & D-4; Kux model 25.
2—Triangle G-2-C Elec-Tri-Pak Weighers & Fillers.
1—Elgin Auto. Twin Piston Filler.
2—Mojonnier #90 Rotary Vacuum Fillers, 14-spout; stainless.
1—Pneumatic Scale Auto. Duplex Labeler, Front & Back.
1—Kyler model "H" Wrap Around Labeling Machine, to #10 cans.
2—Bird 48" dia. Centrifugals St St Perf. Basket.
1—Fletcher 30" Jr. Centrifugal Extractor, St. St. Imperf. basket.
1—Feinc Rotary Vacuum Filter, string discharge, 4'6" dia. x 6', aluminum.
1—Klein #2 Stainless Steel Leaf Filter, 97 sq. ft.
1—Niagara #275 Filter, Monel leaves, heresite lined tank.
10—Distillation Columns, aluminum, copper, steel.

JUST PURCHASED
8—15,000 gal. Vertical Steel closed Processing Tanks, 80# int. W.P., with 970' 3" pipe coil and turbine agitator with 40 HP drive.
Excellent Condition

PERRY EQUIPMENT CORP.
1411 N. 6th St. PHILA. 22, PA.

FOR SALE

3—32" x 90" Buffovak Double Drum Dryers.
600 gallon S.S. Tank, 54" x 60".
75 gal. Monel Jkt. Kettle, 33" x 27", agit.
100 gal. S.S. Clad Jkt. Kettles, 30" x 52".
150 gal. S.S. Jkt. Kettle, 42" x 34", agit.
100 to 200 gal. S.S. Mix Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
26" Centrifugal Extractors, 3 H.P.
Gruendler W B Junior Pulverizer, 10 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes Vacuum Pump, 1½ H.P.
Hobart Grinder, 1½ H.P.
2" Cherry-Burrell S.S. Pumps, 2 H.P.
100 gal. Pfaudler S.S. Premixer.
3000 gal. S.S. Truck Tanks, Trailerized.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street, New York 17, N. Y.
Murray Hill 2-4616

A SERVICE OF SAVINGS

Buy With Confidence From

"CONSOLIDATED"

6—Devine #28 Vacuum Shelf Dryers, each 20 shelves 59" x 78".
3—6' x 50' Louisville Rotary Steam Tube Dryers.
6—Horizontal Dry Powder Mixers, 3000#, 2000#, 1000#, 400#.
1—3000# Stainless horizontal ribbon type Mixer.
1—Day size 30 Imperial unjacketed Stainless lined, Stainless blades, 75 gal.
1—Stainless jacketed Kettle, 300 gal., 100#.
1—42" All Stainless Centrifugal, A.T.&.M. Co., 40 HP motor, suspended type.
8—Oliver Vacuum Filters, incl. 8 x 12', 11'6 x 14', 11'6 x 18.
1—18" x 28" Bird Continuous S/S Centrifugal, copper housing, 10 HP.
1—Mechanical 5' x 16' jacketed Cooker Dryer.
3—Mikro Pulverizers, 2TH, 2SI, 4TH.
1—30" x 30" Alum. Filter Press, 45ch.
1—13,500 gal. stainless clad, vertical mixing tank, S/S coils, 7½ HP motor.
4—Labour Stainless Centrif. Pumps.
4—#12 Sweetland Filters for 36 leaves on 4" centers.
2—Pneumatic Scale Packaging Lines, incl. Carton Feeder, Former, Liner, Weigher, Sealer, etc.
1—Std. Knapp #429 Self-adjusting Gluer-Sealer & Compression Unit.
1—Tolhurst 40" Monel Centrifugal.
1—Buflovak 6' Vacuum Crystallizer.
1—30" x 30" Shriver Filter Press, cast-iron, jacketed.
10—Shriver 42" x 42" cast iron Pl. & Frame Filter Presses, 18, 27, 36, 54 chambers, 1" cake.
16—Sperry 18" x 18" cast iron Filter Presses, P & F., 11 chambers.
2—700 gal. jacketed closed kettles with Simplex Turbo Mixers, m.d.
2—500 gal. steel jacketed, closed, agitated Vacuum Reactors, 125# jacket.

ONLY A PARTIAL LIST

OUR 35th YEAR

CONSOLIDATED PRODUCTS COMPANY, INC.

13-17 PARK ROW
NEW YORK 38, N. Y.
BArclay 7-0600

We Buy Your Idle Machinery

FMC

Good USED EQUIPMENT will PAN OUT for YOU too!

HYDRAULIC PRESSES

2 Farquahr 300 Ton
Fruit Presses 50" x 50"
250 lb. PSI; 16 frames

MIXERS

New and Rebuilt Dry Powder Mixers of the Ribbon Type in Stainless and Mild Steel in all sizes Heavy Duty Mass Mixers, both steam jacketed and unjacketed up to 150 gal. Tumbling Barrel Batch Mixers.

Stainless KETTLES—TANKS

Large stock on hand of Jacketed Kettles up to 300 gal. Single Shell Tanks up to 3000 gal.

DICERS—CUTTERS—CHOPPERS—SLICERS

Urschel Model B in S/S; Sterling EM-1D American Relish Cutters; Smith Silent Cutters; Boutell S/S Slicers; Peelers; Biro Stainless Steel Meat Saw, 1½ HP.

DRYERS—DEHYDRATORS

2 S/S Atmospheric Drum Dryers 5'x-0'
1 Double Drum Dryer; 28"x5'.
Proctor & Schwartz Apron Dryer 40'.

PULPERS—FINISHERS—JUICE EXTRACTORS

Langsenkamp S/S Model B†EZ Adjust Pulpers with 7½ HP motors; others. Chisholm Ryder S/S Model B Extractors.

FILLING EQUIPMENT

M. & S. 10 Pocket S/S Can or Jar Fillers. Mojonnier S/S 14 Head Vacuum Filler. Filler Mach. Co. and Elgin Piston Fillers. Juice Fillers by FMC, Horix, Berlin Chapman. Dry Powder Fillers by Stokes & Smith.

LABELLING EQUIPMENT

Wray around Can and Jar Labellers by Standard Knapp, Burt, Kyler, Nu-Way etc. Spot Labellers semi and fully automatic.

MISCELLANEOUS

Standard Knapp Casers or Boxers, Case Printters; Aut. Gluers and Sealers; Pasteurizers, Washers, Colloid Mills, Coolers, Exhausters, Centrifugals, and hundreds of other items. WHAT DO YOU NEED?

FRED R. FIRSTENBERG, Pres.

FIRST MACHINERY CORP.
157 Hudson Street,
New York 13, N. Y.

A BRILL BUY . . . IS THE BEST BUY

SEE THESE VALUES!

3—Devine #27 double door Vacuum Shelf Dryers, 17—59" x 78" shelves.
2—Stokes 30" x 8', 3' x 15' Rotary Vacuum Dryers.
2—Link Belt Roto-Louvre Dryers 2'7" x 8' Monel, 2'7" x 10' steel.
1—Pfaudler 350 gal. glass lined, agitated Reactor.
2—Pfaudler 100 gal. glass lined, jacketed Stills with glass lined Condensers and Receivers.
1—Sharples SS Super-D-Hydrator #C-20.
3—Buflovak 5' x 12', 42" x 120", 32" x 90", Double Drum Dryers.
1—Albright Nell 60" x 80" Single Drum Flaker.
3—Groen 150, 125 gal. SS Agitated Kettles.
3—Mikro Pulverizers, #1SI, #1SH.
1—Fitzpatrick Comminuter, Model D, S.S.
2—Tolhurst 32", 26" Monel Suspended Centrifugals, bottom discharge.
1—Fletcher 40" S S Suspended Centrifugal.
1—Sperry 24" x 24" Aluminum P&F Filter Press.
2—Robinson Sifters 40" x 84", 40" x 104".
4—Sprout Waldron 40" x 84" SS Sifters.
1—2000# SS Horizontal Powder Mixer.

Send for complete stock list.

BRILL EQUIPMENT COMPANY
2401 Third Ave., N. Y. 51, N. Y.
Tel: CYpress 2-5703 • Cable: Bristen, N. Y.

BARGAIN IN USED CEREAL MACHINE EQUIPMENT

2 McEwen Puffing Machines
1 D & W Puffing Machine
1 Adolph Johnson Toasting Oven
1 Johnson Rotary Steam Cooker
1 Cowan Dryer
2 A.C. Flaking Mills 32" x 40" complete with gear reducers

Details and Prices of Above Equipment Can Be Obtained From

MR. A. J. C. WILLIS
P. O. BOX 6089 MONTREAL, QUE.

FOR SALE

56—36" x 54" Skid Platforms
300 gal. Copper Still with copper condensor and copper tank
80 qt. 4-speed Hobart Vertical Mixer
#76 Enterprise Food Grinder, belt driven
250 gal. Copper steam jacketed kettles for 100 lbs. working steam pressure

SAVAGE BROS. CO.
2633 Gladys Ave., Chicago 12, Ill.

Machinery For Sale:

4 Dehydrators

Louisville 6x50 and Davenports 6x40. All in Excellent condition and in operation at the present time. Critical inspection invited.

UNIVERSAL GRAIN CO. OF N.J.
425 South St. Newark, N. J.

YOUR PREFERRED SOURCE FOR GOOD REBUILT EQUIPMENT

Pneumatic Scale Packaging Line—brand new, all automatic, in the 13,500 serial numbers
4 Transwrap Machine Model A & B
Sprague Sells 6 spout SS Filler model #60, fills from #1 to #10 complete with motor
Knapp & Burt Can or Jar Labelers #1 to #10
30 gal. type 347 SS Reactor Jktd & Agtd.
30 gal. glass lined Reactor Jktd & Agtd.
Capem & Resina Automatic Cappers
New Ribbon Blenders Steel & SS all sizes
New Kettles & Tanks Steel & SS all sizes

WHAT HAVE YOU FOR SALE?

For Better Buys & Service
Phone SOuth 8-4451—9264—8782

YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.
289-10th ST., BKLYN 15, N. Y.

–FOR SALE–

1—AT&M 30" Stainless Steel Centrifuge, Perforated basket, underdriven.
1—Sharples Stainless Steel Super-D Canter #PN-14.
1—Sperry aluminum 42" plate and frame Filter Press, 34 chambers, closed delivery, 3" frames (Unused).
4—Sperry aluminum plate and frame filter presses, 24" x 24", 35 chambers, closed delivery.
1—Glascote glasslined jacketed Vacuum Kettle, 1600 gal. cap.
1—Combustion Engineering Stainless Steel jacketed Vacuum Autoclave, 488 gal. cap., 300 PSI internal 75 PSI jacketed with tube bundle. ASME constructed.
1—Mikro #1-SH Pulverizer.

R. GELB & SONS INC.
UNION N.J.
Est. 1886 UNionville 2-4200

FOR SALE
PEANUT BUTTER FILLING MACHINE

6 cylinder Filler Machine Company peanut butter filling machine complete with right angle discharge stainless steel contact parts, adjustable tubes complete with hopper agitator. Postwar machine in excellent condition complete with spare parts $2,000.00.

W. T. YOUNG FOODS, INC.
Lexington, Kentucky

Charles S. JACOBOWITZ Co.
3083 MAIN STREET · BUFFALO 14, N.Y. · AMHERST 2100

IMMEDIATE DELIVERY

Two Frick 10 x 10 Duplex Ammonia Compressors—less than 25 cents on the dollar, recently inspected by Frick, f.o.b. our Brooklyn warehouse.

Swenson Triple Effect Evaporators, excellent condition, still erected, a real bargain.

Zaremba Triple Effect Evaporators, recently checked over, modern, first-class condition, still erected.

Klein #2 stainless powder filter, 13 screens, never used.

3—5100-gal. Lastiglass-lined tanks, 8'6" OD x 12'9" high, f.o.b. our yard Brooklyn.

Cellulo 6-disc filter with pump.

Eveready 4-spout piston filler for oil, grease, etc.

Partial listing only. Tell us your requirements and also tell us about the surplus equipment you have for sale.

Serving American Industry for over 50 Years

MODERN REBUILT EQUIPMENT

At Tremendous Savings

Immediate Deliveries

UNION Rebuilt Machinery Established 1912

International Stainless Steel Straightline Vacuum Filler, with Automatic Feeder.

Resina Models S and LC auto. Cappers.

Capem E4F 4-Head Rotary Capper.

CRCO New Way MH and Burt adj. Wrap-around Labelers.

Baker Perkins BB, JNM and Readco Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.

Day and Robinson 100, 800, 1500, 2000 lbs. Dry Powder Mixers and Sifters.

J. H. Day 75 gal. Imperial Double Arm Steam Jacketed Mixer.

Day, Ross Pony Mixers; 8 and 15 gal.

B. P.-Type 3500 gal. Steam Jacketed Double Arm Mixer.

Day 650 gal. S. J. Jumbo Mixer.

Stokes, Day, New Era, Hottman Mixers 2 to 3500 gals., with and without Jackets, Single and Double Arm Agitators.

Baker Perkins 150 gal. Unidor Steam Jacketed Double Arm Mixer.

Tri-Colloid #5 Mill and Homogenizer.

Mikro 4TH, 3TH, 1SH Pulverizers; Jay Bee, Schutz O'Neill, Stedman Mills.

Allis Chalmers, Great Western Sifters.

Colton 2, 3 Rotary Tablet Machines.

Pony M and ML Labelrites: Ermold, World Semi and Fully Automatic Labelers.

Stokes & Smith A Transwrap Filler.

S. & S. G1, G2, G6 Auger Fillers.

F. J. Stokes HG88 Duplex Auger Filler.

Whiz Packer and Spee-Dee Fillers.

Triangle Package Models G2C, G2S, N2CA Elec-Tri-Pak Fillers.

Horix and Elgin S. S. Rotary Fillers.

Filler 4-Head S. S. Auto. Piston Filler.

Stokes, Colton Semi Auto. and Fully Auto. Tube Fillers and Closers.

Doughboy Auto. Cellophane Bag Sealers.

Standard-Knapp No. 429 Carton Sealer.

Hudson Sharp Campbell auto. Cellophane Wrapper.

Hayssen; Package Machy. Co. FA, FA4, DF, CA2; Miller and Scandia auto. Cellophane Wrappers.

Sweetland, Alsop and Ertel Filters.

Huhn Steam and Gas-Fired Rotary Dryers.

Pneumatic auto. Cartoning Unit, 60 and 30 per min.

Consolidated 13" Macaroni Presses.

Battery of Grimolas and Macaroni Mixers.

Clermont Auto. Noodle Cutter.

Clermont Reversible Dough Brake.

Additional Information and Prices Available on Request

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

FOR SALE

JAR CAPS

Approx. 280,000 53 M.M. Anchor-vac N style. Plain enamel inside, Gold outside. BRAND NEW.

Price $6.00 per M f.o.b. Allentown, Pa.

ALLEN PRODUCTS CO.
ALLENTOWN, PA.

WE HAVE IN STOCK FOR IMMEDIATE DELIVERY
THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS-STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment Send Us Your Inquiries
We Buy One Item or Entire Plants

AARON Equipment Company
1247 So. Ashland Ave., Chicago 8, Illinois
PHONE: CHesapeake 3-5300

FOR SALE

Cherry-Burrell Viscolizer

1800 GPH, 800 P.S.I. max., 25 HP, originally used to homogenize tomato juice.

Any reasonable offer accepted.

Box 921 Syracuse, New York

BUY FROM RELIABLE DEALERS

3—Lee 300 Gal. Type 316 S.S. Jack & Ag. Tanks.
1—Premier U-3 S.S. 6" Colloid Mill 5 H.P.
1—New Tolhurst 48" S.S. Center Slung Centrifuge.
2—Bird 48" Stainless Steel Sus. Style Centrifuges.
3—Mikro 2 TH and 2 FF Pulverizers.
2—Mikro Sampimill and Bantam SH Pulverizers.
1—Fitzmill S.S. Model "D"—7½ H.P. Motor.
1—Raymond 16" Screen Mill 5 H.P.
9—Stainless Steel Kettles 125 to 950 gals. with Ag.
7—Stainless Steel Tanks 200 to 5700 Gals.
4—Stokes 212-C Vac. Pumps—100 c.f.m.
1—Buflovak 6' Jack. Vac. Cristallizer.
3—Shriver 18" to 42" Wd. P. & F. Filter Presses.
2—Sperry 36" C.I. Filter Presses, Hyd. Closures.
1—Stokes #138 Six Shelf Vac. Dryer 24" x 36".
1—Stokes 48"x108" Double Drum Dryer.
1—Buflovak 42"x120" Double Drum Dryer.
4—Horiz. Spiral Mixers 600 to 2000# Cap.

Send for your copy of Bulletin A-30, listing over 500 desirable items. We invite your inquiries and we pay top prices for individual items to complete plants.

THE MACHINERY & EQUIPMENT CORP.
533 West Broadway
New York 12, N. Y. GRamercy 5-6680

FOR SALE
ERMOLD MODEL 60-31 AUTOMATIC LABELLER

postwar machine capable labelling various jars and tumblers at rate 120 per minute complete with two extra sets pickers and label boxes. Condition excellent. $3,300.00 complete.

W. T. YOUNG FOODS, INC.
Lexington, Kentucky

MODERN PACKAGING EQUIPMENT

FOR IMMEDIATE DELIVERY

SPECIAL

PNEUMATIC SCALE CO. 60 Per Minute Fully Automatic Cartoning Line consisting of Automatic Feeder, Bottom Sealer, 4 Scale Net Weight Filler, Top Sealer, Compression Unit and Sheet Feed Tightwrap.

PNEUMATIC SCALE CO. 35 Per Minute Automatic Cartoning Line Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer and Compression Unit.

J. L. FERGUSON PACKOMATIC HIGH SPEED (70 Per Minute) Cartoning Line consisting of Automatic Feeder, Top and Bottom Sealer, 18 Spout Volumetric Filler with rising and falling bed.

STOKES & SMITH Model B. Transwrap with Auger Fillers.

STOKES & SMITH Model HG84 Fully Automatic Auger Filler with vacuum attachment. Also Models G and GD Semi-Automatic.

PNEUMATIC SCALE CO. 10" Simplex Labeler.

PNEUMATIC SCALE CO. 4" Duplex Front and Back Labeler.

KARL GIEFER 24 Spout and 12 Spout Stainless Steel Rotary Vacuum Fillers.

CAPEM 4 Head Fully Automatic Capper.

WANTED

Single Machine or Entire Plants

ALLIED EQUIPMENT CO.
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

ADVERTISERS IN THIS ISSUE

Allis-Chalmers Mfg. Co. 4
Aluminum Company of America 21
Aluminum Cooking Utensil Co. 55
American Can Co. 126
American Gas Association 183
American Machine & Foundry Co.
4th Cover
American Spice Trade Assoc. BL218
Amerio Contact Plate Freezers, Inc. T217
Ames Iron Works TR221
Amsco Packaging Machinery Inc. 219
Angeles Sanitary Can Machine Co. T215
Armstrong Cork Co.
Building Materials Div. 10
Glass & Closure Div., Metal Caps 159
Armstrong Machine Works 214

Babcock & Wilcox Co., The 20
Bakelite Co., a div. of Union Carbide & Carbon Corp. 60
Baldwin Belting, Inc. 194
Barnes Co., John & W. F. 38
Barry-Wehmiller Machinery Co. 68
Bauer Bros. Co. TR213
Beckman Instruments, Inc. 155
Bemis Bro. Bag Co. 161
Bin-Dicator Co. BR223
Bristol Co., The 31
Buffalo Forge Co. 52

Cambridge Wire Cloth Co., The 184
Canning Machinery Division 152
Carboloy Dept., General Electric Co. 32-33
Carpenter Steel Co., The 124
Carrier Corp. 40
Central Fibre Products Co., Inc. BR217
Century Electric Co. 208
Cherry-Burrell Corp. 70
Clark Equipment Co. 153
Consolidated Packaging Machinery Corp. TL192
Crane Co. 141
Crucible Steel Co. of America 167
Cyclone Fence Div., U. S. Steel Corp. TR191

Darling Valve & Mfg. Co. 177
Darnell Corp., Ltd. 172
De Laval Separator Co., The 64
Dempster Brothers, Inc. 132
Detecto Scales Inc. TL206
Distillation Products Ind. 69
Dodge Mfg. Corp. 140
Dodge & Olcott, Inc. 157
Dow Chemical Co., The 166
Dow Corning Corp. 160
Downington Iron Works, Inc. TR207
du Pont de Nemours & Co., E. I. Kinetic Chemical Div. 144

Economic Machinery Co. 234
Electric Auto-Lite Co., The BR191
Electro Chemical & Engrg. Co. BL206
Electric Storage Battery Co., Inc. 222
Empire Box Corp. 56
Entoleter Div., The Safety Car Heating & Lighting Co., Inc. BL204
Exact Weight Scale Co., The TR195

Fabreeka Products Co., Inc. 18
Fairbanks-Morse & Co. 61
Firmenich Inc. 39
Flexible Steel Lacing Co. TL218
Food Machinery & Chem. Corp. 152
Foxboro Co., The 150
Frick Co. 209
Fritzsche Brothers, Inc. 180
Fuller Co. 54
Fuller Brush Co., The 168
Fulton Sylphon Div., Robertshaw-Fulton Controls Co. 212

Gallaher Co., The BR221
Gas Atmospheres, Inc. 169
Gaylord Container Corp. ..... Third Cover
Gen. American Trans. Corp. 8, 45
General Mills, Inc. B215
Girdler Corp., The 43
Globe Woven Belting Co. 164
Glycerine Producers' Assn. 226
Gotham Instruments 57
Gottscho Inc., Adolph BR205
Gould-National Batteries, Inc. 12
Grinnell Co., Inc. ..... Second Cover

Heyden Chemical Corp. 19
Hinde & Dauch Paper Co. 220
Hoffmann-LaRoche, Inc. 170
Horn Co., Inc., A. C. 17
Howell Electric Motors Co. BL217
Hudson-Sharp Machine Co. 181

Huron Milling Co. 189
Hyster Co. 24

Ingersoll-Rand Co. 227
Ingredients for the Food Processor 228
International Harvester Co. 122
International Salt Co., Inc. 63

Jamison Cold Storage Door Co. 42
Jeffrey Mfg. Co., The 58
Jenkins Bros. 16

Koven & Bro., Inc., L. O. 233

La Porte Mat & Mfg. Co. TR203
Layne & Bowler, Inc. TR225
Lee Metal Products, Inc. BR203
Link-Belt Co. 6, 35

Magnus, Mabee & Reynard, Inc. 128
Manheim Mfg. & Belting Co. 44
Marley Co., Inc., The 190
Master Electric Co., The 156
Minneapolis-Honeywell Reg. Co., Industrial Div. 46-47
Mississippi Agricultural & Industrial Board 151
Mixing Equipment Co., Inc. 135
Monarch Mfg. Works, Inc. 149
Morningstar, Nicol, Inc. TR193
Mosaic Tile Co., The 142
Mundet Cork Corp. 178

Nash Engineering Co. 22
National Airoil Burner Co., Inc. 162
Niagara Blower Co. 186
Niagara Filter Corp. 14-15
Nicholson Co., W. H. BR199
Nutritional Research Associates, Inc. 228

Oakite Products, Inc. 173
Ohio Injector Co., The 29
Orr & Sembower, Inc. 48

Package Machinery Co. 148
Paterson Parchment Paper Co. 120
Pfaudler Co., The 179
Pfizer, Charles & Co., Inc. 59
Phillips & Co., H. A. TR223
Pioneer Rubber Co. BL198
Pittsburgh Corning Corp. 49
Pneumatic Scale Corp. Ltd. 34
Polak & Schwarz, Inc. RC225

Quaker City Cold Storage Co., Inc. 228

Refined Syrups & Sugars, Inc. 62
Republic Steel Corp., Alloy Steel Div. 176
Rheem Mfg. Co. 201
Rhinelander Paper Co. 165
Riegel Paper Corp. 130

SALES REPRESENTATIVES

ATLANTA 2 ..... Ralph Maulsby
1321 Rhodes-Haverty Bldg. ..... Walnut 5778
BOSTON 16 ..... J. F. Juraschek
856 Park Square ..... Hubbard 2-7160
CHICAGO 11 ..... D. T. Kenney
520 N. Michigan Ave. ..... J. G. Cashiin
Whitehall 4-7900
CLEVELAND 15 ..... Thomas E. Taylor
1510 Hanna Bldg. ..... Superior 1-7000
DETROIT 26 ..... Thomas E. Taylor
856 Penobscot Bldg. ..... Woodward 2-1793
DALLAS 1 ..... J. H. Cash
First National Bank Bldg., Prospect 7-5064
LOS ANGELES 17 ..... J. H. Allen
1111 Wilshire Blvd. ..... Madison 6-4323
NEW YORK 36 ..... J. F. Juraschek
330 West 42nd St. ..... C. C. Randolph
Longacre 4-3000
PHILADELPHIA 3 ..... Edward A. Martin
17th & Sansom Sts. ..... Rittenhouse 6-0670
PITTSBURGH 22 ..... Thomas E. Taylor
7389 Oliver Bldg. ..... Atlantic 1-4707
SAN FRANCISCO 4 ..... Ralph E. Dorland
68 Post St. ..... Douglas 2-4600
ST. LOUIS 8 ..... D. T. Kenney
Continental Bldg. ..... Lucas 4867
LONDON, ENGLAND ..... W. John Tydeman
95 Farrington Street, E.C. 4.

Rietz Mfg. Co. BL192
Ritchie & Co., W. C. 154
Ryerson & Son, Inc., J. T. TR199

Sarco Co., Inc. BL216
Schoettle Co., Edwin J. 51
Schutz O'Neill Co. TR205
Seedburo Equipment Co. TL216
Shepard Niles Crane & Hoist Corp. 182
Snell, Foster D., Inc. BL200
Sparkler Mfg. Co. 174
Sprout, Waldron & Co., Inc. 188
Staley Mfg. Co., A. E. 28
Standard Conveyor Co. BR207
Standard Oil Co. (Indiana) 53
Standard Steel Corp. TL200
Steamaster Automatic Boiler Co. B213
Steelcote Mfg. Co. 211
Stephens-Adamson Mfg. Co. 50
Sterwin Chemicals, Inc., Vitamin Div. 25
Syntron Co. TL204

Taylor Instrument Companies 196
Thermoid Co. 30
Trailmobile Inc. 146

Union Bag & Paper Corp. 210
Union Carbide & Carbon Corp. Bakelite Co. 60
U. S. Steel Corp. 23, TR191

Van Ameringen-Haebler, Inc. 163
Victor Chemical Works 36-37
Viking Pump Co. BR193
Visking Corp., The 65

Wahl-Henuis Institute TL198
Wallace & Tiernan Co., Inc. 187
Walworth Co. 41
Westinghouse Electric Corp.
Apparatus Div. 224
Motors & Controls 66-67
Sturtevant Div. 26-27
Weston Electrical Instrument Corp. 185
Where to Store Frozen Foods 228
White Motor Co., The 175
Worthington Pump & Machinery Corp. Air Conditioning & Refrigeration 202

Yarnall-Waring Co. BR195

PROFESSIONAL SERVICES 228

SEARCHLIGHT SECTION
(Classified Advertising)
H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 228
Selling Opportunities Offered 228
Positions Wanted 228
Selling Opportunities Wanted 228
Employment Services 228
EDUCATIONAL
Schools 228
BUSINESS OPPORTUNITIES
Offered 229
PROPERTY
Wanted 229
EQUIPMENT
(Used or Surplus New)
For Sale 229-231
WANTED
Equipment 229

ADVERTISERS INDEX

Aaron Equipment Co. 231
Allen Products Co. 231
Allied Equipment Co. 231
Brill Equipment Co. 230
Consolidated Products Co., Inc. 229
Equipment Clearing House Inc. 230
First Machinery Corp. 230
Gale, C. J. 229
Gelb & Sons, Inc., R. 230
Jacobowitz Co., Charles S. 230
Kehoe Machinery Corp., Lester 229
Loeb Equipment Supply Co. 229
Machinery & Equipment Corp. 231
Miami School for Processing Specialties 228
Penn Bottle & Supply Co. 229
Perry Bros. Co. 229
Savage Bros. Co. 230
Union Standard Equipment Co. 231
Universal Grain Co. of N. J. 230
Young Foods Inc., W. T. 230, 231
Willis, A. J. C. 230

BACK IN THE 1880's

WHEN ARTIFICIAL SILK WAS FIRST PROCESSED

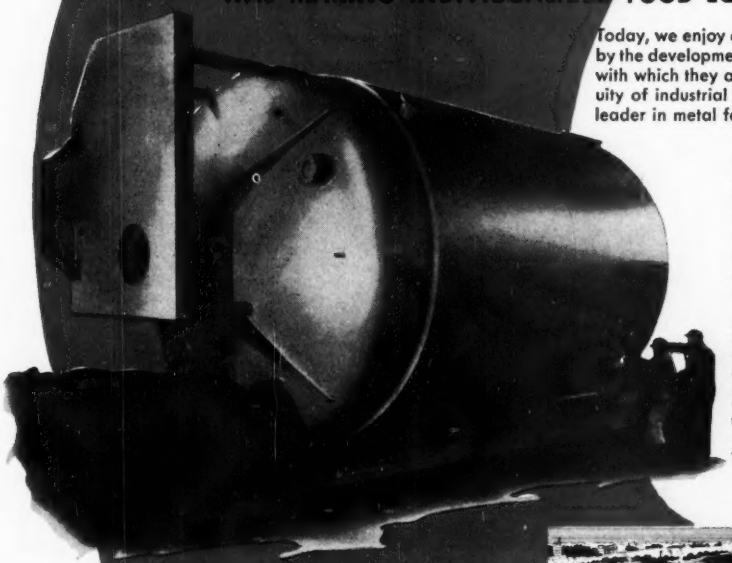
Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

Today, we enjoy a host of products made possible by the development of artificial silk. And the speed with which they are produced is due to the ingenuity of industrial pioneers such as L. O. KOVEN, leader in metal fabrication.

Yes, over 70 years of experience shaped KOVEN know-how. This is why KOVEN Individualized Equipment, tailored to meet the exact needs of manufacturers, not only achieves production peaks but cuts costs and increases profit. Call or write for a consultation — no obligation.

Complete modern facilities including X-ray inspection and stress relieving which insure quality control. KOVEN equipment in all commercial metals and alloys include: pressure vessels, extractors, mixers, stills, condensers, kettles, tanks, chutes, containers, stacks, coils. Fabrication to A.S.M.E. Code par. U-68 and U-69 a specialty.



12'0"x1[illegible]" stainless clad pressure vessel.

PLANTS:

Jersey City, N. J.

Dover, N. J.

L. O. KOVEN & BRO., INC. 134 Ogden Ave., Jersey City 7, N. J.

KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881

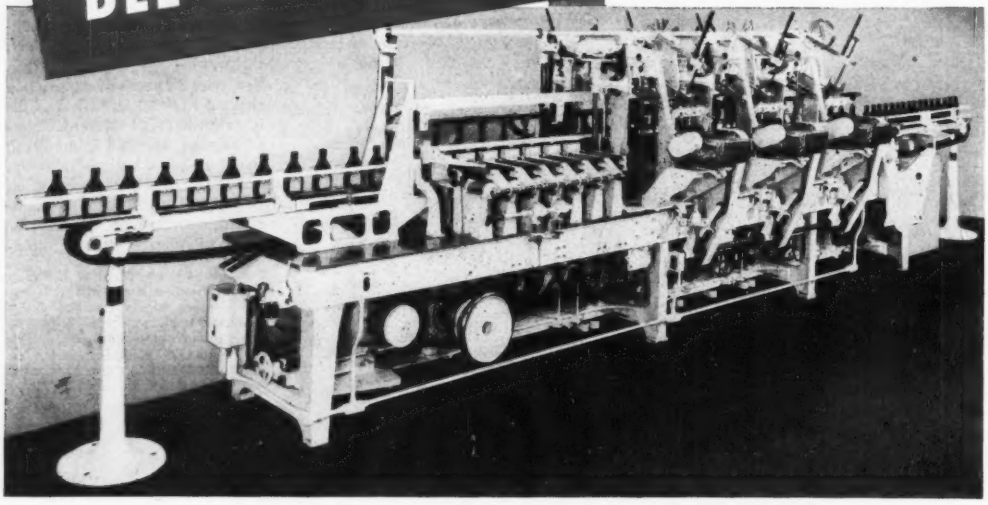
NOW

HIGH QUALITY LABELING
HIGH PRODUCTION LABELING
Combined in One Labeler

The New Model 150
WORLD BEE-LINE LABELER

The quality and precision of label application for which the BEE-LINE is already famous, you can now get *three-at-a-time* from this new BEE-LINE with three labeling stations.

Like the single and twin station BEE-LINES, the Model 150 handles the most difficult of labeling applications smoothly, surely and steadily. If it's *production* as well as quality labeling you're after, here's the answer.



● FOR RECOMMENDATIONS, SPECIFICATIONS, ESTIMATES . . . GET IN TOUCH WITH . . .

WORLD LABELERS
"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY
WORCESTER 3, MASSACHUSETTS
DIVISION OF GEO. J. MEYER MANUFACTURING CO.
MILWAUKEE, WISCONSIN

For food-plant employees and consultants only . . .

Reader Service

Use this **FREE INFORMATION** *service*

to obtain further details on equipment, supplies and processes described in editorial and advertising pages of this issue of FOOD ENGINEERING

HOW TO USE POSTCARD

Circle numbers of products you want to know more about; fill in your name, position and address; drop card in mail (no postage required). We tell companies what you want and they reply to you.

TO MAKE IT HANDY

Below is an alphabetical list of products and new literature described in advertisements and the following regular departments: New Equipment and Supplies; New Packages and Products; and Just Off the Press.

WHAT THE NUMBERS MEAN

The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisement. Capital letters following page numbers identify products and literature described in monthly editorial departments.

The same numbers appear on the postcard in numerical order.

Described in this issue:

Adhesive, resin base.....131E
Air conditioning equipment
  Fans 118C, BR221
  Humidity control, catalog L2210
  Hygrol, moisture-absorbent liquid L186
Air shipping treatise....L225N
Air transformer 123C
Aluminum, booklet L225K
Antifoam L160
Batteries—Industrial 222
Belts
  Conveyor
    Metal TR191
    Neoprene L194
    Steel, flexible. TR203, TL218
    Woven cotton, cellulose coated L164
    Cotton-rubber 18
  V 44
Boilers B213
  Linings, refractory.....L2230
  Steam 48
Brake motor 127C
Cabinet, utility L225M
Casters; wheels L172
Chains; sprockets 6
Chemical price list.....L225F
Chemicals—Flour bleaching & maturing agents.....25d
Chrome carbide 32-33
Cleaning compounds & equipment
  Brushes L168
  Sanitizing agents 25g
  Steam detergent cleaning R173
Cloth, wire, industrial.....L184
Coatings
  Non corrosive, catalog. L223M
  Vinylite resins 60
Colors, food, certified.....25e
Combustion equipment...L219C
Combustion units
  Oil burner "SA".....L162b
  Registers, universal ...L162a
Compressors; air 227
Consultations, research, analysis services TL198
Conveyor systems 50
Conveyors
  Air 54
  Bearing L225C
  Belt-rubber 30a
  General line BR207
  Gravity L223F
  Roller turntable 127B
Cooling towers L219K
Cranes & hoists.....L182
Disintegrators BL192
Doors, cold storage.....42
Drives—V-belt 4, 30c
Dryers 8, 35, 152a, TL200
Electrical modernization service 224
Emulsifier 69
Enamel
  Dry surface R211
  Mildew resisting 131B
Enrichment concentrates....25c
Fans 26-27, 52
Filters
  Dust L221C
  Horizontal 14-15
  Horizontal plate L174
  Oil L221F
  Spray-jets 125D
Fire extinguishers L225L
Flavors
  Catalog C L180
  General line CR225
  Maple, imitation 163
  Raspberry 39
  Spices
    Blended 128
    Spiceolates R157a
    Spisoresins R157b
  Vanillin 25b
Floor maintenance L223N
Floor surfacing 17, BL206
Food ingredients, wholesale price list L223P
Food starches & thickening agents TR193
Gages—Pressure L221H
Gas 183
Generators—
  Atmosphere R169, TR221
Gloves
  Industrial neoprene ...BL198
  Liquid-tight L225E
Glycerine 226
Grate, magnetic TR213
Grinding equipment—Pulverizers TR205
Guard rails 119B
Hair net visor.....131C
Heater L219I
Heat transfer apparatus.....43
Heat transfer equipment. TR207
Heat transfer medium....L166
Hoists
  Portable 119A
  Vehicle L225I
Hose—General line.....30b
In plant chlorination.....R187
Insecticide, non toxic.....131F
Instruments 46-47, 57
Instruments—
  Catalog 500A 196
Insulations
  Cellular glass 49
  Cork L178
  Industrial 10
Laboratory, balance L221B
Laboratory equipment ...L221I
Lubricants 53
  Dual purpose 131D
  Gun metal #1120.....129B
Materials of construction—Steel TR199
Measurement & control instruments
  Aquameter R155
  Analyzer 88G, 88I
  Bin level indicators 87A, BR223
  Catalog L221K
  Colorimeter 88H
  Controllers
    Absolute-pressure 87C
    Position 89H
    Recorder 88B
    Standard level 87D
  Controls, pumps, compressors L221N

POST CARD

For Food Plant Employees and Consultants Only

Circle the numbers of the items—editorial or advertising—that interest you. Consult listings above and on following page for the correct number.

FOOD ENGINEERING
OCTOBER, 1952

CIRCLE NUMBERS HERE, FILL IN NAME AND ADDRESS, AND MAIL

2	26-27	45	65	89B	123B	131E	158A	R169	BR191	TL204	BR217b	L221B	L223D	L225F
4	28	46-47	66-67	89C	123C	131F	158B	L172	TR191	BR205	BR217c	L221C	L223E	L225G
6	29	48	68a	89D	124	132	158C	R173	BL192	TR205	T217	L221D	L223F	L225I
8	30a	49	68b	89E	125A	135	159	L174	TL192	BL206	BL218	L221E	L223G	L225J
10	30b	50	69	89F	125B	140	L160	175	BR193	TL206	TL218	L221F	L223H	L225K
12	30c	51	70	89G	125C	141	R160A	176	TR193	BR207	L219A	L221G	L223I	L225L
14-15	31	52	87A	89H	125D	142	L161A	R177	L194	TR207	L219B	L221H	L223J	L225M
17	32-33	53	87B	89I	126	144	R161	L178	BR195	208	L219C	L221I	L223K	L225N
18	34a	54	87C	117A	127A	146	L162a	179a	TR195	BR209	L219D	L221J	L223L	TR225
19	34b	55	87D	117B	127B	L148	L162b	179b	196	210	L219E	L221K	L223M	226
20	35	56	87E	118A	127C	R149	R162A	L180	BL198	R211	L219F	L221L	L223N	227
21	36-37	57	88A	118B	128	150	R162B	R181	TL198	212	L219G	L221M	L223O	233
23	38a	58	88B	118C	129A	R151	R162C	L182	BR199	B213	L219H	L221N	L223P	234
24	38b	59a	88C	119A	129B	152a	R162D	183	TR199	TR213	L219I	L221O	TR223	236a
25a	38c	59b	88D	119B	129C	152b	R162E	L184	BL200	L214	L219J	L221P	224	236b
25b	39	59c	88E	119C	129D	R153	163	R185	TL200	B215	L219K	TR221	CR225	236c
25c	40	60	88F	120	130	154	L164	L186	201	T215	L219L	222	L225A	236d
25d	41	61	88G	121A	131A	R155	165	R187	202	BL216	R219	BR223	L225B	236e
25e	42	62	88H	121B	131B	156	L166	L188	BR203	TL216	220	L223A	L225C	236f
25f	43	63	88I	122	131C	R157a	167	189	TR203	BL217	BR221	L223B	L225D	236g
25g	44	64	89A	123A	131D	R157b	L168	190	BL204	BR217a	L221A	L223C	L225E	

Other request .....

Name .....Title .....

Company .....Street .....

City .....State.....Card expires January 10, 1953

FREE INFORMATION SERVICE for food plant employees and consultants
(See other side)

(CONTINUED)
- Electronic control elements L221L
- Index controllers L223A
- Indicator 88D
- Liquid level 150
- Moisture TL216
- Manometers L221E
- Panelboards L221A
- Pressure regulator 212
- Pyrometers L221D
- Recorder, multipoint 88C
- Tachometers, precision L221M
- Temperature instruments R185
- Temperature recorders & indicators BR191
- Thermometers—Electric controlled L210L
- Thermostat, fire detecting 88F
- Viscosimeter 121B

Meters
- Contact-meter relays...L221J
- Flow 89E
  - Dry 87B
  - Electromagnetic 87E
  - Los pressure differential 88A
- Fluid, automatic L223B
- Probe viscosimeter 88E

Microscope, breweries....L221O
Mississippi BAWI law....R151

Mixing equipment
- Mixers 135
  - Automatic 236d
  - Dough 236c
  - High speed BL204
  - Vertical 236f

Monsodium glutamate ...28, 189
Motors & controls.....66-67

Motors
- Control centers L221G
- Electric BL217
- Gear 156, L219J
- Overload release 140
- Price list L219E
- Protective frames 208
- Variable speed 118A

Nozzles—gas burner L225D
Ovens 236a
Packaging book 220

Packaging machines
- Auger feed 129C
- Bag, folder, labeler & sealer R219
- Bag producer L223G
- Bulletin L223D
- Cans
  - Caser 152b
  - Double seamer 38a
  - Fillers, valveless 38b
  - Marker 68b
  - Seamer T215
  - Unloader 38c
- Cappers 34b, L223H
- Cap tightener 123B
- Carton former L148
- Coder, automatic 117B
- Filler & sealer L223I
- Labellers...34a 68a, 129A, 234
- Label machine 125B
- Marker, conveyor line..L223J
- Scales TR195
- Screw capper TL192
- Rolacoder BR205
- Wrappers R181, 236b

Packaging materials
- Aluminum foil 21
- Bags
  - Polyethylene, round bottom R162E
  - Unwoven, rayon & cotton fibers 65
- Boxes
  - Corrugated BR217b, 210
  - Folding & set-ups...BR217c
  - Paperboard BR217a
- Caps
  - Metal 159
  - Plastic 158A
- Cartons 158B
- Containers
  - Bags R161
  - Boxes
  - Paper 51
- Can 126
- Cans, key open R160A
- Cartons
  - Folding 56
  - Mailing tube shape, lard liner R162A
- Catalog 154
- Drums, aluminum 55
  - Glassine liner L161A
- Paper, general line 130
- Drums, lithographed.....201
- Labels R162B
- Meat wrappers 120
- Overwrap, cellophane....158C

Paper
- Booklet L225B
- Greaseproof, wet strength 165
- Plastic film, vinyl.....R162D
- Wrappings, holiday ...R162C

Phosphates 36-37
Pipe—Welding fittings...L223L
Piston packings R177
Porcelain equipment.....118B
Preservative, food 19

Processing equipment
- Agitator, mixer L219B
- Concentrator 40
- Crusher, sawtooth L188
- Deaerators 179b
- Dough make-up equipment 236c
- Dry cleaning machine...110C
- Filler 179a
- Kettles, corrosion-resistant BR203
- Malt leveler 125A
- Mixers—Bulletin 509..L219G
- Pretzel making machine..236g

Pulleys, magnetic L223C

Pumps
- Air motor-driven 121A
- Bladeless, impeller 61
- Catalog L219D
- Diaphragm 89F
- Rotary BR193
- Vertical turbine TR225
- Volume & feed systems L219F

Punch card systems.....L225G
Railroad car; trans-flow.....45

Refrigerants
- Fluorinated hydrocarbon..144
- Non-melting 127A

Refrigeration control systems TR223

Refrigeration equipment
- Compressors, ammonia 202, BR209
- Freezer, contact plate...T217
- Purger L214

Research laboratories....BL200
Salt, savings 63
Scales TL206, L221P
Scanning system 89I
Screens, general L223E
Separators—Centrifugal 64
Sinks, steel laboratory....125C
Speed Drive—Variable....117A
Spices—Natural BL218
Spray nozzles R149
Starch, wheat B215
Steam traps BR199, BL216, L219A

Steam trap selector—Bulletin T1750 .....L219H
Steel, stainless.....23, 167, 176
Strainers BR195
Sugar, liquid 62

Tanks
- Stainless, jacketed.....233
- Storage 70

Telephone systems L225J
Temperature ph, speed-controlling & recording.....31
Tile 142
Towers, cooling 100
Tractors 175
Trailors 146

Trucks
- Commercial 122
- Industrial
  - Accessories 131A
  - Batteries 12
  - Electric fork 129D
  - Gas, electric fork.....R153
  - Lift 24
  - Special container 132

Tubing & pipe, stainless....124
Tubing—Stainless steel.....20
Valves & fittings.....41

Valves
- Diaphragm 2
- General line 29
- Gate, set 89B
- Heater 123A
- Hydraulic 89C
- Manual-set 89D
- Operator 89A
- Pressure regulator, brass 141

Vibrators
- Bin, feeders TL204
- Electric 58

Vitamins
- A 59a
- B 59b
- C 59c
- Feed formulas 25f
- General line 25a

Washing system, can.....L223K
Water softener L225A
Weighing system 89G
Wheat starch B215

INDEX TO ADVERTISERS IS ON PAGE 232

Postage Will be Paid by McGraw-Hill Pub. Co.

No Postage Stamp Necessary if Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 64, (Sec. 34.9, P. L. & R.) New York, N. Y.

FOOD ENGINEERING

330 West 42nd Street

New York 36, N. Y.

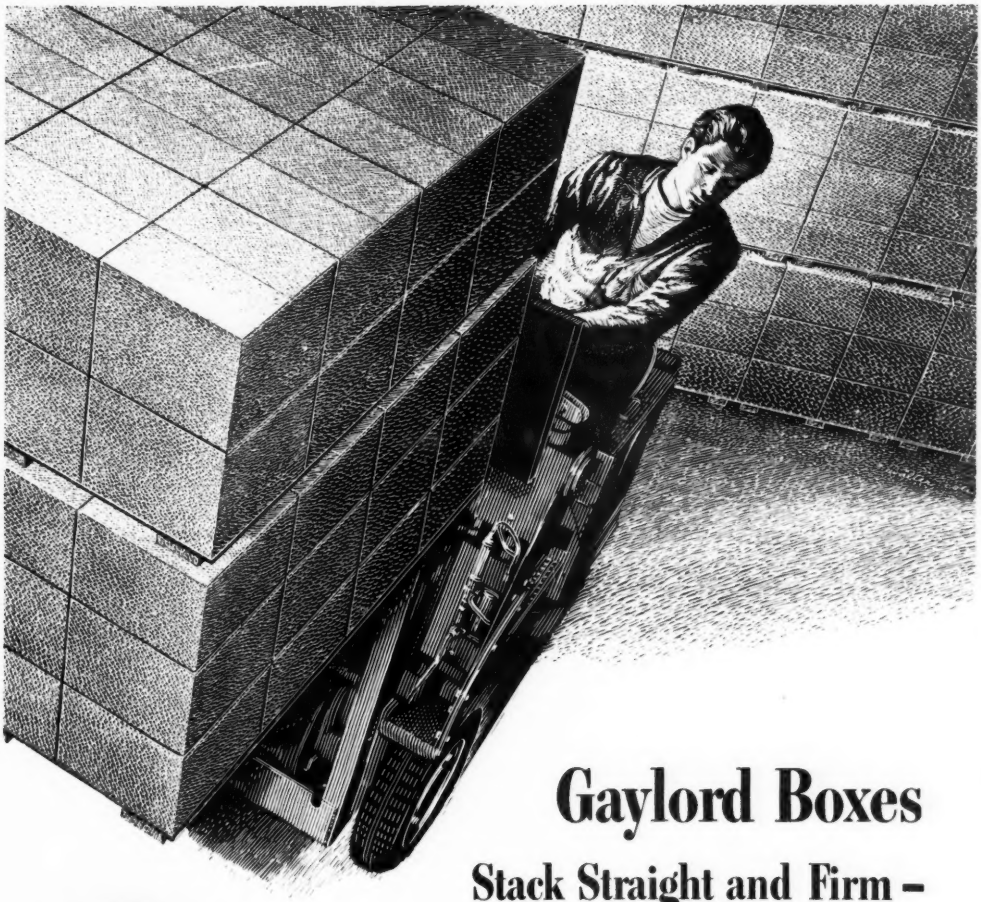
←

No Stamp Needed

Mail Today

FOOD ENGINEERING

OCTOBER, 1952



Gaylord Boxes

Stack Straight and Firm – Save Time and Labor in Handling

Gaylord Boxes

Their unseen quality gives you an extra margin of safety.

The strong, rigid corrugations of Gaylord Boxes plus their accurate scoring assure flaps that close perfectly.

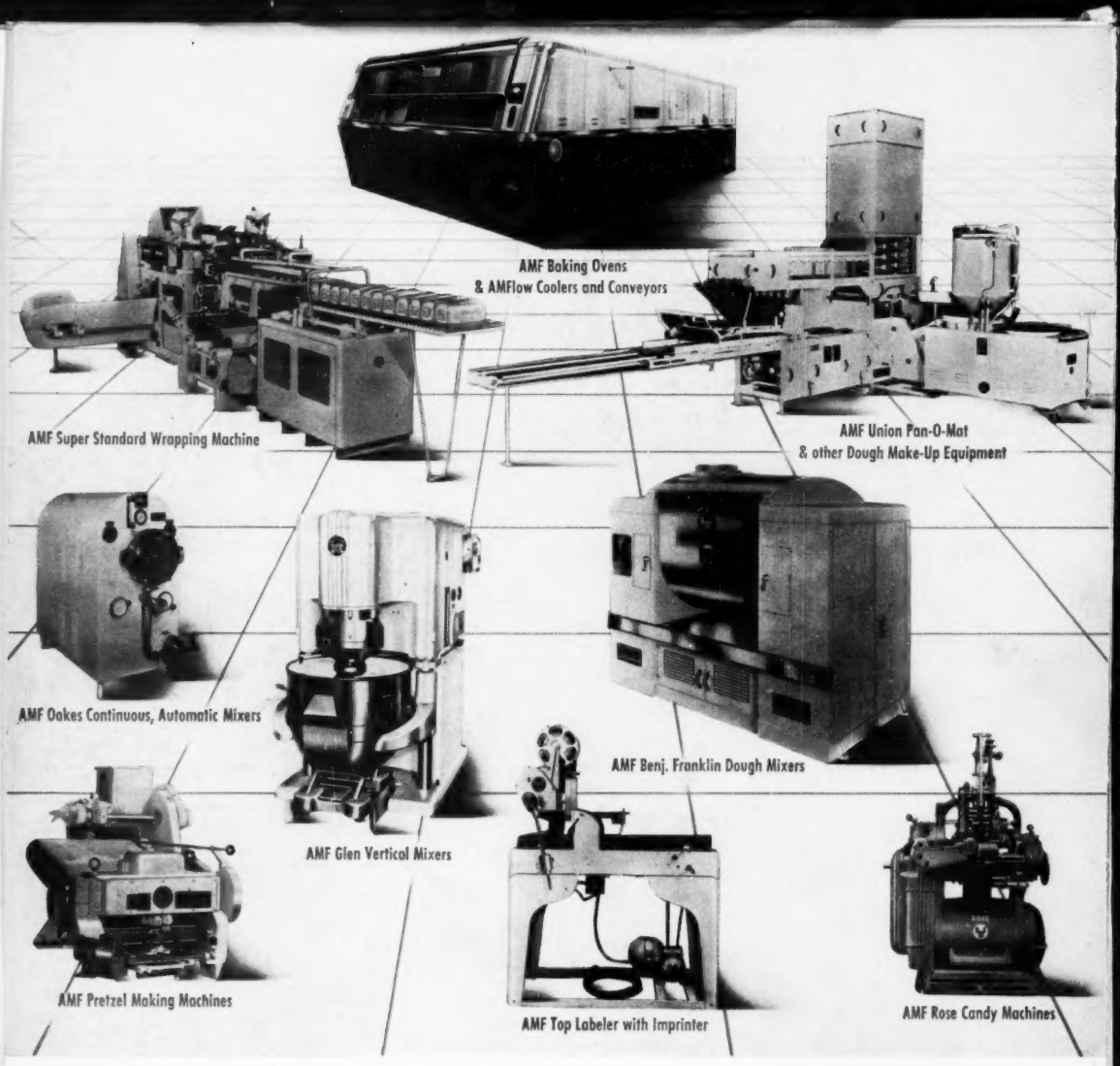
This controlled quality means a real saving of time and labor—as well as tempers—on the production line as well as in the warehouse.

Gaylord's Research and Engineering Division is at your service. Check with the sales office nearest you for the latest developments in packaging for your industry.

GAYLORD CONTAINER CORPORATION

General Offices: ST. LOUIS • *Branches:* New York • Chicago • San Francisco • Atlanta • New Orleans • Jersey City • Indianapolis • Los Angeles Seattle • Houston • Oakland • Minneapolis • Detroit • Columbus • Fort Worth • Tampa • Dallas • St. Louis • Cincinnati • Des Moines Oklahoma City • Portland • Greenville • San Antonio • Memphis • Kansas City • Bogalusa • Chattanooga • Milwaukee • Weslaco • New Haven Amarillo • Appleton • Hickory • Sumter • Greensboro • Jackson • Miami • Omaha • Mobile • Philadelphia • Little Rock • Charlotte • Cleveland

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT BAGS AND SACKS • KRAFT PAPER AND SPECIALTIES


AMF Baking Ovens
& AMFlow Coolers and Conveyors
AMF Super Standard Wrapping Machine
AMF Union Pan-O-Mat
& other Dough Make-Up Equipment
AMF Oakes Continuous, Automatic Mixers
AMF Glen Vertical Mixers
AMF Benj. Franklin Dough Mixers
AMF Pretzel Making Machines
AMF Top Labeler with Imprinter
AMF Rose Candy Machines

How to Increase Food Processing Profits

Want to increase profits in *your* plant? Then look to AMF for the economies of automatic machine operation.

Whether your business is baking, confectionery, dairy products, cereals, meats, fish, etc., you will find AMF machines especially made for you.

AMF engineers develop new equipment, improve existing machines, and work out applications of AMF equipment to fit specific needs. For 51 years AMF has helped mechanize one industry after another. It has developed new and improved machines to produce quality goods at low cost. *Your* business can benefit from one or more of the machines we make.

Write to Mr. A. N. Cona for literature and information on the machines that interest you.

AMF DOES IT BETTER—*AUTOMATICALLY!* SINCE 1900

AMERICAN MACHINE & FOUNDRY COMPANY

485 FIFTH AVENUE, NEW YORK 17, N.Y.